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TREATMENT OF CLOSED FRACTURES OF RADIUS AND ULNA*

BY

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It seems logical to adopt a standard form of treatment for certain fractures, if such is followed by a normal and lasting function, and is achieved in as short a time as possible. Axis and skeletal traction are considered up to date in the treatment of fractures. In forearm fractures my experience in their use is small and is never likely to be greatly increased, as other methods appear preferable. It is my intention to lay stress on the appreciation of the anatomical relationship of the radius and ulna at the superior and inferior radio-ulnar joints when fractures of the forearm are treated.

In the review of nearly 400 cases of forearm fractures it has been interesting to study the length of time each case has been under treatment. To make this possible the cases reported are only those treated from start to finish in one institution. Cases treated in nursing homes and other hospitals and those referred after some treatment—a considerable number—are excluded. This method of investigation has advantages in that the work has been in one clinic and the immediate setting has been carried out in the greater number of cases during a five-year period by casualty officers and orthopaedic house-surgeons, who show the utmost keenness and are severely critical of the success of their work, but are in no sense of the word experienced until it is time for them to pass to other appointments. Hence methods are advocated which are considered the simplest and seldom necessitate the admission of the patient to hospital: further manipulative or operative methods are employed only when they fail. Of 374 fractures it is found that twenty-eight were treated by open operation (7.4 per cent.). This low figure is accounted for by the large number of greenstick fractures in the series, for 75 per cent. of the fractures occurred in patients under the age of 20.

It is obvious that hospitals in industrial areas have in their clinics a far greater proportion of closed forearm fractures in adults than occur in this series, and my own experience is enlarged by accidents seen elsewhere. However, the detail of the treatment of the common injury, simple as it may appear, is worthy of consideration.

Group I—Bamboo and Greenstick Fractures with Little or No Displacement

After *x*-ray examination a plaster is applied, usually no anaesthetic being required. Records show that some of the slight injuries were treated on Carr's splint. A child is safer at school with the plaster on, and seldom does a parent meddle with it. The type of plaster employed is standardized for all the fractures under discussion.

	No. of Cases	Upper Third	Middle Third	Lower Third	Average Time Under All Treatment (Weeks)	Longest Time Any One Case Under Treatment (Weeks)
Radius and ulna	31	0	9	22	6.2	12
Radius ..	58	0	5	53	5.8	9
Ulna	4	1	2	1	6.7	10
Group as a whole	93	1	16	76	6.2	12

METHOD OF APPLYING PLASTER-OF-PARIS BANDAGE

The elbow is bent to a right-angle, and the forearm supinated and wrist slightly dorsiflexed. A thin slab of plaster is applied to the back of the arm and extensor surface of the forearm, extending from the lower border of the axilla to the metacarpal necks. This fits accurately on to the skin, and by two lateral cuts is made to fold round the elbow, coming forwards just over the epicondyles. It should cover slightly more than the posterior half of the skin area of the limb. A piece of wool is placed in front of the elbow. A flannel or plaster wool bandage is applied round hand, forearm, and arm to secure the plaster to the skin and to act as padding for the flexor surface of the forearm and antecubital fossa. A plaster bandage is wound round the limb from metacarpal necks to lower axillary border. This is never pulled tight, but folded to and fro and moulded in. The most distal turn should be round the neck and head of the metacarpal of the index finger and not in the apex of the web between thumb and index finger. A second bandage similarly applied may be required. During the moulding process an attempt should be made to produce a slight furrow along the front and back of the forearm in the line of the space between radius and ulna, but the inclusion of a piece of wood in the plaster to serve this purpose is unnecessary.

When the plaster extends only to "just above the elbow" some movement will take place at that joint, so that the plaster will cut in at the back of the arm and in front at the fold of the joint.

The patient is instructed to move the shoulder, fingers, and thumb straight away, and in some cases is advised to attend the massage department for assistance. Swelling of the hand may result from the injury itself or a plaster splint applied too tightly or incorrectly. Flexion contracture of the fingers may be due to haemorrhage in the forearm muscles, too tight a plaster, or the beginning of Volkmann's ischaemic contracture.

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Group II—Greenstick Fractures with Angulation of One or Both Bones, which were Treated by Closed Methods

	No. of Cases	Upper Third	Middle Third	Lower Third	Average Time Under All Treatment (Weeks)	Longest Time Any One Case Under Treatment (Weeks)
Radius and ulna	114	11	64	39	8.6	16
Radius ..	44	1	11	32	7	11
Ulna.. ..	6	1	3	2	7.7	11
Group as a whole	164	13	78	73	7.8	16

When any angulation is present the child is anaesthetized and the fracture is completed, so that the forearm bones can be fixed in plaster in anatomical alignment. If this is not carried out deformity will follow which may or may not straighten out subsequently. If one bone only is affected the supination-pronation range of movement may be limited for some time and the other bone may bow as it grows. The completion of the fracture is simple if carried out over a rubber-padded wedge of wood. At first there is a fear of doing damage or of causing displacement, but it is quickly overcome. When one bone is angled in the upper third and the other two or three inches lower down, the forearm should be placed obliquely over the wedge. Reference will be made to re-fractures in children later; because of these, six weeks' complete fixation and a week in the posterior half of the plaster is considered necessary.

Group III—Fractures Other than Greenstick, which Required no Reduction, or in which Reduction was Contraindicated

	No. of Cases	Upper Third	Middle Third	Lower Third	Average Time Under all Treatment (Weeks)	Longest Time Any One Case Under Treatment (Weeks)
Radius and ulna	5	0	3	2	9.5	20
Radius ..	10	0	3	7	8.4	19
Ulna.. ..	14	2	6	6	14.8	20
Group as a whole	29	2	12	15	10.9	20

The injuries recorded in this group have been treated on similar lines. The patient usually reaches hospital wearing a first-aid appliance with the forearm pronated. Manipulation into full supination is painful, so that an anaesthetic is necessary for the application of the plaster. The fractures of interest in Group III are those of the ulna alone. If there is a crack only, or a fracture with one or more loose fragments lying close to the bone, union will not be delayed. Both the fractures of the upper third of the bone took longer than the average time to unite, and one took twenty weeks. The average is nearly double that recorded for the radial fractures, but possibly extra care was employed. In this series there was no case of non-union in the lower third, the recognized danger area.

There is no doubt that the basis of Baldwin's operation is well founded, as periodically patients seek treatment for non-union of the ulna three inches or so above the wrist when fixation has been brief. When further fixation or physiotherapy fails to produce union a bone graft is advisable. Consolidation of graft and bone is more likely to occur if a tibial graft is used in preference to a sliding graft from the ulna.

Group IV—Fractures Other than Greenstick with Overlap or Angulation, which were Treated by Closed Reduction

	Total	Upper Third	Middle Third	Lower Third	Average Time Under All Treatment (Weeks)	Longest Time Any One Case Under Treatment (Weeks)
Radius and ulna	39	2	17	20	9.3	26
Radius ..	14	3	2	9	9.3	24
Ulna.. ..	7*	2	2	3	9.4	13
Group as a whole	60	7	21	32	9.3	26

* Includes two cases of fracture of the upper third of the ulna with dislocation of the upper end of the radius.

Treatment of fractures in this group is one of the most difficult problems in fracture surgery. Success in alignment by closed reduction is economical in the patient's time and saves pain and further operative treatment.

Radius and Ulna.—When there is *angulation* this is corrected and a plaster is applied under an anaesthetic. *When there is overlap* the patient is anaesthetized and traction and countertraction applied. Manipulation will frequently succeed in reducing the transverse and, less often, the oblique fractures. If neither bone hitches the fractured ends are turned backwards towards the extensor surface of the forearm and an attempt made to hitch them. This method is easily understood by those who employ it in open reductions. Should this fail a method worthy of trial is to manipulate the radius only and, if this hitches, employ the radius as a lever and pull out to full length the fragments of the ulna. The reverse of this is less easy.

(i) If alignment and end-to-end apposition are achieved—that is, "both bones hitched"—plaster is applied in the manner described. For its application with the patient recumbent the arm is abducted to a right-angle, the elbow flexed to a right-angle, and the fingers, pointing to the ceiling, held by an assistant. It is most important to mould in the interosseous space to prevent it "being crowded," as there is a great tendency for the upper radial fragment to tilt towards the ulna.

(ii) If neither bone can be hitched the decision has to be made as to whether to employ fixation with the bones in the position of overlap or to proceed to another method of reduction. It is universally accepted that unreduced fractures of the lower third of both bones, at the same level, in children are followed by full function and a perfect radiographic appearance after a few years. This may also apply to fractures of the upper third, but the prognosis is less certain. In adults overlap of both bones should be corrected.

(iii) If one bone is hitched and the other not, the decision whether full function will be obtained is usually difficult. In children, when the radius is hitched and not the ulna, plaster is applied; but when the ulna is hitched further treatment is advised. In adults, risk as to ultimate function is taken if alignment is not restored. Should it be found that good alignment with ample separation of the radius and ulna cannot be obtained with the forearm fully supinated, but is possible, say, in mid-position, the limb should be put in plaster in this position. Similarly, full wrist dorsiflexion or slight palmar flexion—although undesirable on general principles—may enable the surgeon to place the bones in better alignment.

The treatment advocated when manipulation has failed is considered subsequently, when operations on forearm bones are discussed.

The value of physiotherapy in these cases of imperfect reduction is worthy of consideration. The most valuable form is what may be termed "preventive." If the patient moves the fingers and thumb from the day of the fracture, which is always possible in closed fractures, there should be no stiffness of finger-joints, and the wrist and elbow will regain their movements if their fixation has been in the correct position. As pronation is a movement of necessity, the patient will regain this if the mechanical relations of bones and radio-ulnar joints allow it and the muscles and their nerve supply are intact. The muscles will be assisted by physiotherapeutic measures when fixation can be released.

RADIUS

As overlap of the radius may be associated with a complete separation of the lower epiphysis of the ulna,

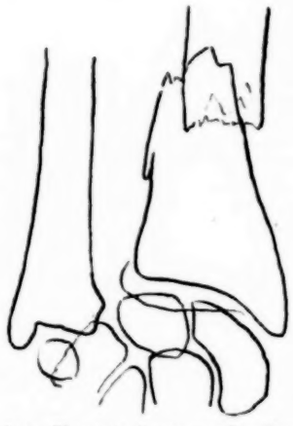

FIG. 1.—Sketch to illustrate fracture of radius with overlap and dislocation of inferior radio-ulnar joint.

or in adults with subluxation or dislocation of the inferior radio-ulnar joint, it is important that the skiagram should include the wrist-joint. Theoretically, it should be easier to reduce by manipulation a fracture of the radius alone than one of both bones, as the ulna can be used as a lever. This is seldom the case, as fractures of the radial shaft are usually oblique and will not hitch. If manipulation fails to correct an overlap in the distal half of the radius, further measures should be adopted to correct this in an adult, but it is not always necessary in a child. If the inferior radio-ulnar joint is not in anatomical alignment open reduction is advisable (see below).

ULNA

No discussion on fractures of the ulna alone is complete unless adequate thought is given to the "fracture of the ulna in its upper third associated with an anterior dislocation of the upper end of the radius." The anatomy of the fracture is an angulation or overlap of the ulna, with displacement of the head of the radius above the capitellum, the orbicular ligament being torn. The radial head may be within or have penetrated the anterior ligament of the elbow-joint. There is shortening of the length of the forearm. The injury is most common in childhood, when the ulna is usually broken in the upper third; after the age of 15 the ulna tends to be broken nearer the centre of the shaft. The injury is not to be confused with (*a*) oblique fracture of the olecranon with forward dislocation of the radius and ulna, with intact orbicular ligament usually occurring in the early "teens"; nor with (*b*) fracture of the upper third of the ulna with fracture of the radial neck in adults.

A correct diagnosis is essential for the treatment. Error may occur owing to the skiagram not including the elbow-joint, so that there is lack of appreciation of the dual injury. Early and correct treatment should produce a normal elbow. Unsuccessful treatment or delayed treatment may be followed by limitation of movement and weakness, particularly if a false joint is formed at the site of ulnar fracture. All the cases that have been treated by manipulation and plaster, or by operation, within a few days have full movement and no disability, whereas all cases operated on after delay have disability, including the case of a boy aged 4. The immediate treatment consists of reduction and fixation.

Reduction.—Unless the head of the radius has passed through the anterior part of the capsule, which is probably rare, the reduction of this dislocation causes no difficulty. As length is given to the forearm by such a manipulation, the ulna tends to come into alignment. However, this is not sufficient, for the length of the forearm should be maintained by the ulna, so that there is joint space between the head of the radius and the capitellum. If the surgeon relies on the length of the forearm being maintained by the radius, the radial head is likely to be pressed against the capitellum. In that position redislocation is liable to occur, or if it does not erosion of articular cartilage and subsequent traumatic arthritis will follow. Hence the alignment of the ulna is the primary consideration. When the fracture is transverse or oblique with a notch, it should be possible to manipulate the bone until it is hitched and full length obtained. Probably during the manipulation the upper end of the radius has slipped back into place. If the ulnar reduction is difficult traction and countertraction with manipulation can be tried, or the manipulation can be repeated after reduction of the head of the radius.

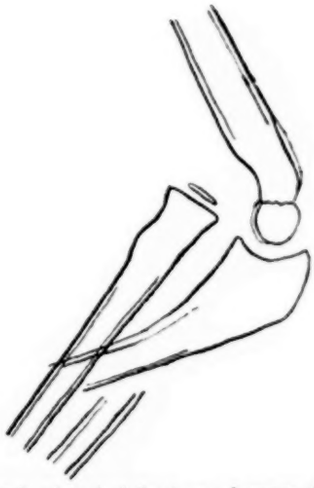

FIG. 2.—Sketch of typical fracture of upper third of ulna with forward dislocation of upper end of radius.

Fixation.—As soon as the surgeon feels confident that he has achieved the reduction, a plaster is applied as for a fracture of the forearm. At the same time traction and countertraction should be applied by a band round the arm tied to a hook or held by an assistant, and by traction on the fingers. Moulding to keep the upper half of the radius back is as important as that to maintain the ulnar alignment. This plaster is removed in six weeks, and the posterior half worn for another two weeks.

There is likely to be criticism of this position of the arm, as acute flexion is reputed to be the position of choice after setting this fracture-dislocation. But it is recognized by advocates of this position that redislocation may occur. In acute flexion no attempt is made to keep a joint space,

and the cup on the head of the radius may not remain in correct relation to the capitellum. Further, the alignment of the ulna is far more difficult to control in this position than when the elbow is at a right-angle. Although some orthopaedic surgeons may favour the acute-flexion position and take exception to the position advocated, probably all agree that the best functional end-results are to be expected if the ulna has been allowed to heal with no deformity or shortening.

INDICATIONS FOR OPEN OPERATION

On the Ulna.—(*a*) Failure to reduce the overlap of the ulna. (*b*) Rare cases when the upper end of the lower ulnar fragment has penetrated the skin. An open reduction is likely to enable the surgeon to hitch the ulna and give it full length, and internal fixation is not required unless there is a constant tendency to angulation. (*c*) In late cases with angulation of the ulna or non-union of the fracture.

On the Radius.—(*a*) When reduction is not achieved by manipulation the outer side of the elbow-joint should be explored and the entanglement of the head in the soft structures relieved. (*b*) When redislocation of the radius occurs: it is contended that this is not an indication for operation on the radius, as it can be controlled by proper reduction of the ulna and moulding of the plaster. (*c*) In late cases of unreduced dislocation the question may arise whether a greater range of movement will occur if open reduction is employed. It is considered that an open reduction of the dislocation and of the fracture by separate incisions is indicated if the patient is seen during the second to sixth week or so.

After a long interval in an unreduced case it may be tempting to remove the head and neck of the radius, but little is to be gained by this, and the arm is likely to be weaker.

On the Orbicular Ligament.—Fascial grafts to repair or replace the orbicular ligament can be employed. If an open reduction of the dislocation is indicated a stitch without a graft will assist in the healing. When a case is operated on a few weeks after the injury an attempt to make a new ligament is desirable. In the late unreduced cases such a repair is not likely to be followed by good function. The fixation of the fascial graft to the ulna is difficult.

OPERATIVE TREATMENT OF FRACTURES OF RADIUS AND ULNA

If manipulation fails to correct displacement of the fracture the surgeon has to decide on the next procedure. This decision should be made immediately, because an operation will be more difficult after a few weeks, and its result is likely to be less effective than if it is undertaken as soon as the skin is adequately prepared. It has been stated already that failure to correct overlap of forearm bones in children does not necessarily indicate that further intervention is advisable. The procedures possible are:

Closed Reduction by Mechanical Methods.—(*a*) By axis or skeletal traction: neither of these has appealed to me in treating the fractures under discussion, and my experience is limited. (*b*) Manual traction assisted by manipulation of Steinmann's pins inserted into one or both fragments.

Open Reduction.—When carried out within a few days of the injury open reduction makes it possible to restore anatomical alignment with little trauma to the tissues. The pain is slight after two days, and function is restored in a reasonable time. Provided adequate skin preparation is undertaken and the operation is done under such conditions as are suitable for any bone surgery, the risks of complications are minimal.

Group V—Fractures Other than Those Shown in Groups I-IV which were Treated by Open Operation owing to Overlap, and Failure of Closed Reduction

	No. of Cases	Open Reduction	Plating One or Both Bones	Bone Graft	Average Time Under All Treatment (Weeks)	Longest Time Any One Case Under Treatment (Weeks)
Radius and ulna	22	16	5	1	20.2*	112
Radius ..	4	0	4			
Radius lower third with separated ulnar epiphysis ..	1	1				12
Ulna upper third with dislocation upper end radius ..	1	1				12
Group as a whole	28	18	9	1		

* If 2 cases under treatment for 112 and 52 weeks are excluded, the average length of time under treatment is 15 weeks.

OPERATION

This is as follows. (*a*) Application of pneumatic tourniquet after exsanguination of the limb. (*b*) Exposure of the fracture and a length of the shaft above and below this. (*c*) Incision and raising up of the periosteum and attached muscles in the axis of the limb. (*d*) Elevation of each end of the fracture by grasping the shaft an inch from the fracture with bone-holding forceps which will fit the radius or ulna. (*e*) Removal of clot and other intervening substance. (*f*) Realignment and hitching of the bones by grasping each fragment; this is possible by traction, or angulation into the wound, hitching, and straightening. It may be necessary to carry out this on each bone. It is my routine to restore the radius first. If the ulna has hitched as the length of the forearm is re-established, the bone is not exposed. If the ulna has not hitched the radial wound is packed and the ulna realigned through a second incision. The ulnar fracture will generally dovetail in and fit snugly. This wound is closed and the radius is then realigned.

(*g*) *Fixation.*—(i) In most cases requiring operation the fracture of the radius and ulna is oblique, but there are notches at the fracture, which can be fitted in. So the operation is limited to an open reduction. If the bone fits snugly and does not bow, the periosteum and overlying muscles are stitched, the wound closed, and plaster applied. A small dressing is used and a plaster slab applied to skin and dressing on the extensor surface of the limb. More padding is applied before circular turns are made. (ii) Internal fixation is advisable in all cases of fracture of the radius in the upper third owing to the tendency for the upper fragment to swing inwards, and in every case in which there is doubt as to whether the radius will stay in correct alignment. A thin plate with two screws in each end is used. Obviously the risk of inserting a plate by Lane's technique is small, and nothing can be more disheartening than the occurrence of angulation or slipping of the bones during the closure of the wound or application of the plaster-of-Paris after an "open reduction" without fixation. Plating of the ulna is seldom necessary. A bone graft may be employed if a long loose fragment makes the application of a plate to the two ends of the

shaft difficult. Cases of non-union of bone after plating radius and ulna are known to us. It is usually possible to obtain the history and serial skiagrams. This serious complication appears to be due to fixation of the plate to the shaft although the fractured ends are not in apposition, to loosely fitting screws, to the introduction of sepsis, or to splinting of an inadequate type or for too short a period. In some cases more than one of these factors has been present.

All the cases reported in Group V are known to have full function. The case under treatment for 112 weeks is interesting in showing difficulties which may be encountered.

A girl aged 8 had a transverse fracture at the junction of the middle and lower thirds of the radius and ulna, with overlap of the bones. At the time of the primary reduction, which was satisfactory, it was noted that she had blue sclerotics. She had not broken any other bones. Just before she was due for discharge she fell down and re-fractured the limb, producing a similar fracture. It was again reduced satisfactorily. Shortly after the child left hospital the mother thought the plaster was dirty, so she immersed the whole limb in water. When this plaster was removed the arm was tense and the child developed the signs of an ischaemic paralysis. She was under treatment for many months for this, and union of the bone was delayed. While still under treatment she broke it again, but the setting was not satisfactory and an open reduction was carried out. That was in 1936, and the child now has a normal arm.

The patient under treatment for one year was a man of 36 who had the radius and ulna plated. The records suggest that he wished to attend hospital until litigation was settled. Apart from these two cases the average period of treatment is 50 per cent. longer than when treatment is by closed reduction.

Complications

Swelling of the forearm is a frequent sequel to reduction and application of plaster-of-Paris. This should be treated by incising the plaster up the middle of the front of the forearm, and not by enlarging the opening for the fingers and thumb. If the patient is not relieved the incision should extend the whole length of the plaster. The plaster should be prised open, and later can be fixed together by elastoplast. *Re-fracture* occurred in this series in ten children; of these, three had re-fractures twice and one three times. It is difficult to determine how many of these sustained a subsequent injury sufficient to break a normal bone. When some years ago it was first noticed that re-fractures were occurring, the length of fixation was increased; but study of the records does not suggest that this eliminated the complication, to which attention was drawn by me (Buxton, 1926). *Volkmann's ischaemic contracture* (Garber, 1939) occurs in a small number of cases treated either in plaster casts or splints. It may be accompanied by median nerve paralysis. Its recognition should be followed by removal of splinting and elevation of the limb. If pain persists and voluntary movement is still greatly restricted, operation is indicated within a few hours. *Median nerve paralysis* without contracture was seen in one case in the series. Delayed operation restored function. Ulnar nerve injury has not been observed. *Synostosis* of radius and ulna is recorded as a not uncommon sequel to infected fractures of radius and ulna, but must be rare in closed fractures. *Decalcification* of the forearm bones and carpus may follow closed fractures in children and adults, but is less common than around the ankle. It appears that imperfectly reduced fractures are more liable to this complication than those which have been perfectly aligned.

Conclusion

In the treatment of forearm fractures two principles must form the basis of treatment: the correction of displacement of the bones and the fixation of the limb for a sufficient length of time to prevent the risk of displacement. The patient has seldom to be in bed, for even after operation he can be up in a few days. The shoulder and fingers should be moved by the patient himself from the beginning of the treatment. The superior and inferior radio-ulnar joint must be in perfect anatomical position after setting a forearm fracture.

Summary

The progress of nearly 400 fractures treated in one hospital has been studied. These are considered in five groups.

Stress is laid on recognition and treatment of dislocation or subluxation of the superior or inferior radio-ulnar joint with fracture of a single forearm bone (fracture of upper half of ulna and forward dislocation of upper end of radius, and fracture of lower third of radius with dislocation of inferior radio-ulnar joint).

Volkmann's ischaemic contracture is recorded.

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CLINICAL SIGNIFICANCE OF TUBERCLE BACILLI IN THE URINE

BY

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The term "urinary tuberculosis" is used to describe a clinical condition characterized by tuberculous lesions in the urinary tract, by the presence of urinary symptoms, and by the excretion of pus and tubercle bacilli in the urine. The term "tuberculous bacilluria" is employed to cover an occult or subclinical tuberculous infection associated with the excretion of tubercle bacilli in the urine but unaccompanied by any urinary symptoms. Tubercle bacilli are to be found in the urine in both these conditions, but it is important to decide whether the case is one of established urinary tuberculosis or of simple bacilluria. The object of this paper is to compare the results of urine tests in these two conditions.

Tuberculous Bacilluria

Tuberculous lesions of the urinary organs, whatever be their location, are almost invariably the consequence of a blood-stream infection from an active tuberculous lesion in some other organ in the body. All the evidence goes to show that the kidney is the first part of the urinary tract to be affected and that the renal lesion is at first bilateral. Tubercle bacilli brought to the kidney by the blood stream give rise to minor tuberculous lesions unaccompanied by signs or symptoms. Most of these are undetected and heal spontaneously without causing any discoverable injury. So long as these minor lesions persist, tubercle bacilli may be excreted in the urine in small numbers. Conversely, whenever tubercle bacilli are found in the urine it may be assumed that pathological lesions exist in the kidney, though a particularly thorough examination

may be necessary to discover them. A perfectly healthy kidney cannot excrete tubercle bacilli.

This type of occult or subclinical tuberculous infection of the kidney, accompanied by tuberculous bacilluria, may occur in any form of tuberculosis, but it is specially likely to be found in forms of tuberculosis spread by the blood stream, such as disease of bones and joints. Harris (1930) proved the existence of tuberculous bacilluria in sixteen out of forty-three adults and nine out of sixty-seven children with tuberculous bone lesions. Band (1935) also found tubercle bacilli in the urine of twenty-five out of 174 patients with extra-urinary tuberculosis. He watched these patients for several years, but only two subsequently developed renal tuberculosis. Tuberculous bacilluria is not so common in pulmonary tuberculosis, and Menton (1932) found only one case in seventy-six patients examined. However, the proportion of positive findings must depend on the frequency with which tests are carried out. Mack (1937) found fifteen cases of tuberculous bacilluria in twenty cases of extra-urinary tuberculosis, but some of his cases were examined several times. One patient was examined on fourteen occasions, but only four tests were positive.

The suspicion may arise that a tuberculous bacilluria is simply the first sign of clinical renal tuberculosis, which may manifest itself with the usual signs and symptoms at a later date. This is not necessarily the case. Many patients suffering from tuberculous lesions in other organs of the body than the urinary tract, but exhibiting tuberculous bacilluria, have been kept under observation for several years, yet no urinary symptoms have developed. In fact, further tests have shown that the kidneys have ceased to excrete tubercle bacilli, and it may be assumed that the minor lesions in the kidney have healed. We are now in a position to group together the features which characterize the excretion of tubercle bacilli in tuberculous bacilluria. They are as follows:

(1) Only a few tubercle bacilli are excreted in the urine, and it is very rare for them to be discovered in stained films of the centrifuged deposit. Guinea-pig inoculation is nearly always necessary for the demonstration of tuberculous bacilluria. (2) The excretion of tubercle bacilli is intermittent, so that the test may be positive on one occasion and negative on another. (3) The urine is clear in appearance and does not as a rule contain pus or blood, but at the time when tubercle bacilli are being excreted microscopical examination will reveal an excess of leucocytes in the urine. (4) In cases of tuberculous bacilluria the excretion of tubercle bacilli may cease when the patient's general health improves.

Urinary Tuberculosis

As already stated, there is abundant evidence that the minor tuberculous lesions of the kidney responsible for tuberculous bacilluria may heal spontaneously; on the other hand, a small proportion progress and give rise to clinical urinary tuberculosis. No hard-and-fast line can be drawn between tuberculous bacilluria and clinical urinary tuberculosis, but in general it may be said that clinical urinary tuberculosis is accompanied by symptoms, by constant abnormalities in the urine and pathological changes in the kidney, demonstrable by radiology and by renal function tests. Since in most cases the patient only comes for medical examination when urinary symptoms have developed it follows that tuberculous disease of the urinary organs is rarely discovered in the preclinical phase. Now, the symptoms of urinary tuberculosis are not directly due to disease of the kidney but are caused chiefly by the passage down the ureter of irritating material and by the extension of the disease to the ureter and bladder. In fact, most cases of urinary tuberculosis are not diagnosed until the tuberculous lesion in the kidney has broken down and discharged its contents into the renal pelvis and infected the ureter and bladder. The disease is now at such an advanced stage that it may require to be treated by nephrectomy if only one kidney is affected.

Surgeons have often declared that nephrectomy is the only treatment for unilateral tuberculous disease of the kidney, because the disease cannot heal by natural means. This statement should be qualified by saying that natural cure is unlikely in any case of urinary tuberculosis discovered by a surgeon, for the simple reason that the surgeon has discovered it too late. In the earlier pre-clinical stage the disease might well have been arrested and cured by medical treatment. Up to the present the only patients who have had the good luck to have their renal tuberculosis discovered in the pre-clinical or occult stage have been those who happened to be selected for inclusion in a research or who enjoyed the services of an exceptionally thorough clinical pathologist. A much larger number of cases might be discovered and be given timely medical treatment if urine tests were carried out as a routine in extrarenal tuberculosis, especially in disease of bones and joints which are obviously haematogenous in origin. Regular examination of the urine with inoculation into guinea-pigs might thus reveal cases of tuberculous bacilluria in the pre-clinical stage. Surely it is as important to watch over incipient tuberculosis of the urinary organs as it is to carry out repeated examination of the chest or of the rate of blood sedimentation.

Comparison of Urinary Conditions

We may now compare the condition of the urine in clinical urinary tuberculosis with the state of affairs in tuberculous bacilluria. The chief points of distinction are as follows:

1. In clinical urinary tuberculosis the urine contains large numbers of tubercle bacilli, and they can generally be found in stained films of the centrifuged deposit. Cultures and guinea-pig tests are rarely necessary for the diagnosis of clinical urinary tuberculosis. It is better to repeat the microscopical examination two or three times and to make films from the deposit of a twenty-four-hour specimen of urine. When these tests have been negative, and I have proceeded to cultures and guinea-pig tests in order to allay the importunity of a surgeon, I have nearly always found the cultures and guinea-pig tests also to be negative. It often happens that something else is discovered during the six to eight weeks required for animal inoculation tests, and by the time the little guinea-pig has ploughed its lonely furrow the interest in his behaviour has considerably declined.

2. The excretion of tubercle bacilli is constant, and acid-fast bacilli can be found in films almost each time the urine is examined. I have proved this by repeating urine tests frequently, and in most cases of urinary tuberculosis it has been possible to find tubercle bacilli each day the urine was examined. In six cases of urinary tuberculosis in which acid-fast bacilli were relatively scanty I collected each specimen of urine the patient passed over a period of twenty-four hours (usually fifteen to twenty samples) and examined each one with the object of finding out at what time of the day or night tubercle bacilli were excreted in largest numbers. As a rule tubercle bacilli were most easily found in the urine passed first thing in the morning. This was not due to any influence of the hour, but simply to the fact that these samples were the most concentrated and contained the largest quantity of pus.

3. In urinary tuberculosis the urine always contains a few pus cells, and often the pyuria is sufficient to cause a definite

turbidity. I have never found tubercle bacilli in films of urine which did not contain a very few pus cells or a few red blood corpuscles. If a very dilute and watery urine is sent for examination and no pus or blood or bacteria are found in the films the best plan is to arrange to examine a more concentrated specimen or the deposit from a twenty-four-hour sample.

4. In urinary tuberculosis the excretion of tubercle bacilli will continue as long as the tuberculous lesion can discharge freely into the urinary tract. Whenever tubercle bacilli are found easily in films from the centrifuged deposit of the urine one can be sure that there is an open tuberculous lesion of the urinary tract, and if acid-fast bacteria are found in urine collected from one kidney it is certain that there is a tuberculous lesion of the kidney discharging into the renal pelvis. I reached this conclusion as the result of dissection of sixty tuberculous kidneys removed by nephrectomy before I knew of the work of Medlar (1932), Lieberthal and von Huth (1932), and Kjaer (1937). In each of these sixty cases I had examined the urine before operation, and in some had found tubercle bacilli in films, whereas in others the diagnosis had been based on guinea-pig tests, on cultures, or by other means. Whenever tubercle bacilli had been found in films the subsequent dissection of the kidney revealed an open tuberculous lesion. The smallest focus was a small tuberculous ulcer situated on the apex of a renal papilla. Next in size were small caseating lesions communicating with one of the calices. Tubercle bacilli were present in largest numbers in the ulcerating type of tuberculous lesion with extensive cavities. The films were generally negative in closed tuberculous lesions associated with calcification. In one case with double renal pelvis and double ureter I found pus and tubercle bacilli in the urine from the upper ureter, but the urine from the lower ureter contained no pus, and no tubercle bacilli were seen in films. On examining the kidney after it had been removed by nephrectomy I found an open tuberculous cavity communicating with the upper renal pelvis, whereas the tuberculous lesion of the lower pole was "closed" and had no direct communication with the lower renal pelvis.

Summary

Tuberculous bacilluria is the result of an occult or subclinical tuberculous infection of the kidney, and may occur in many different forms of extrarenal tuberculosis, especially in disease of bones and joints. Tubercle bacilli are present in the urine in small numbers only and are rarely found by microscopical examination. Guinea-pig tests are necessary to demonstrate tuberculous bacilluria. The excretion of tubercle bacilli is intermittent. The urine is generally clear in appearance, though containing an excess of leucocytes. The excretion of tubercle bacilli may cease when the patient's general health improves.

In clinical urinary tuberculosis the urine contains large numbers of pus cells, and these can generally be found in stained films. Guinea-pig tests and cultures are rarely necessary. The excretion of tubercle bacilli is constant, and will continue as long as an open tuberculous lesion can discharge freely into the urinary tract. In clinical urinary tuberculosis the urine always contains a few pus cells, and often the pyuria is sufficient to cause a definite turbidity. These points enable a distinction to be made between results of laboratory tests in tuberculous bacilluria and in clinical urinary tuberculosis.

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A PSYCHOLOGICAL ASPECT OF THE REARMAMENT PROGRAMME

BY

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It is forty-six years since Sir William Mather, at the Salford Engineering Works, found that reduction of weekly working hours from fifty-three to forty-eight resulted in an actual increase in total output. During the present century, and before the war of 1914–18, there gradually accumulated evidence which further illustrated the positive relation which modification of working week bore to increase of output. These findings were confirmed by the Health of Munition Workers Committee (1917 and 1918). Knight, writing in 1928, summarized his comments as follows:

(i) Every reduction in the working day leads to a decrease in accidents, spoiled work, sickness, and absence. (ii) The reduction of working hours from twelve to ten leads to an increase in hourly and daily output. (iii) The reduction of working hours from ten to eight leads to a further increase in hourly and daily output, except in operations whose speed depends mainly on the speed of machinery. (iv) The reduction of working hours below eight, though increasing hourly output, does not usually lead to an increase in daily output.

To some engaged in medical, and particularly in psychiatric, practice it is becoming apparent that these lessons, even if they have been learnt, are not being adequately applied at the present time, and the aim of this communication is to enlist the help of the profession in drawing attention to the problem before its effects begin to make themselves felt not only upon the health of individuals concerned but upon the vigour with which the nation can continue to prosecute its cause.

Statement of the Problem

Among cases of psychoneurosis investigated at a psychiatric out-patient clinic, and in which occupational factors are prominent, there has lately come to be included a type of breakdown that can be ascribed to a situation having fairly well-defined features. The clinical characteristics, though of less striking interest than the features of the situation from which they derive, have exhaustion in some form as their common basis, and they may be grouped as follows:

(*a*) Relative failure referred to cognitive function in its finer aspects, such as attention and its associated processes of application, concentration, recent memory, maintenance of train of thought, and ability for expression. (*b*) Diminution of instinctive "drives" as displayed by some failure of emotional life, volitional and conative trends such as ability for interest, affection, capacity for "looking forward," general resilience and spontaneity—the "personality" of the patient in the sense used by Mayer-Gross (1938).

The features of the underlying situation found to be common to all cases were: (i) Skilled nature of occupation. (ii) High degree of individual, or collective (foreman), responsibility. (iii) Atmosphere of "rush" and pressure reinforced by knowledge that work was connected directly or indirectly with the nation's emergency and rearmament programme. (iv) Continuous "overtime" work, with resulting extension of working week consider-

ably beyond normal working conditions. (v) Relatively high wages, and increased opportunity for wage-earning partly contributed to by Item iv.

Illustrative Case Material

A. B., aged 29, worked as a fitter in an arms factory. From the age of 14 to 28 he had worked in a similar capacity making machinery used in biscuit manufacture ("that suited me fine—moving about on all different types of work"). Before his breakdown he was working seven days to the week, his hours being distributed in the following way: Monday to Friday inclusive, 8 a.m. to 10 p.m. (with breaks totalling one and a half hours); Saturday and Sunday, 8 a.m. to 5 p.m. (break one hour) On alternate Sundays he was allowed off. His total working week was seventy and a half to seventy-eight and a half hours. From time to time he had the opportunity of working occasional "bursts" from 9 a.m. Monday to 5.30 p.m. Tuesday, continuously save for the usual breaks (one hour dinner, half an hour tea), together with a rest period of three hours for sleep. His weekly earnings averaged £7 15s. It was during one of the "thirty-two-hour bursts" that the patient "felt something snap" inside his head—the start of his breakdown. He complained of inability to shift his mind from one thing to another, mental depression, and pains in the limbs. He stated that "crowds overface me." He spontaneously observed that "chronic monotony set in with me; I'd never been used to being tied in the one place." He volunteered the view that his breakdown was attributable to overwork.

C. D., aged 57, was a foreman electrician to a large shipbuilding yard, where he had worked as improver, journeyman, charge-hand, and foreman for forty years. During the long years of slump and depression in trade, in which the shipbuilding industry was seriously involved, the patient had no difficulty in shouldering the responsibility, that of chief in his own department, for the whole yard. With the advent of rearmament, however, and the securing of large Government contracts the position changed very materially, and the firm were constrained to reopen a yard that had lain idle. Five weeks before being referred for psychiatric investigation the patient had had what he described as "an improvement" at work—he had been made foreman over the two yards—"and they're mad busy." He was delighted at first, had welcomed his promotion with enthusiasm; then, ten days before being seen, "something seemed to strike me in the back of the head." He complained of inability to concentrate, weakness in the legs, worry about his work, pain at the back of the head, and the feeling that he was "worn out." He expressed the view that if he had his old job back (that is, responsibility for one yard only) his difficulties would disappear.

E. F., aged 27, was a tool-setter in an aircraft factory, where he first began work in April, 1938. For three to four months before being referred for psychiatric investigation he had been working seven days a week and on continuous overtime, his hours being distributed as follows: Monday to Thursday inclusive, 8 a.m. to 8 p.m. (breaks totalling one and a half hours); Friday, 8 a.m. to 6 p.m. (break, one hour); Saturday and Sunday, 8 a.m. to 5 p.m. (break, one hour). His weekly earnings amounted to over £8. He complained of mental exhaustion, mental depression, physical feelings of tiredness, and lack of natural inclinations and appetites.

In six consecutive cases of the material under review the weekly working hours were: 76, 65, 74½ (average), 71½, 73½, 76½. The figure in the second case (65) is admittedly lower than the others, but this apparent advantage was offset by the fact that the patient, a charge-hand electro-plater in an aircraft factory, was a night worker, and had been so continuously for four years. Throughout the series studied relatively high wages were found to be the rule, remuneration for skilled tradesmen being commonly £7 to £8—and even up to £10—a week.

Discussion

To avoid confusion and unnecessary multiplication of terms it would perhaps be simplest to apply to the condition under review a term previously used by Tredgold (1933)—namely, that of "acute neurasthenia." It may be recalled that Tredgold did not use this term in a general sense, but restricted its application to a condition in which there occurs "marked failure of mental capacity" and to which "physical fatigue becomes superadded, and the individual suffers from a general nervous exhaustion. In addition to the incapacity for sustained efforts, either mental or physical, there is inability to make decisions, faulty attention and memory, loss of emotional control, and increased irritability."

To persons versed in applied psychology, whether in its social, industrial, or medical aspects, it will be apparent that the common factors enumerated above represent a combination of inducements, moral and material, that may be calculated to stimulate every department of the ego. The appeals of patriotism, self-esteem, the team spirit, and the position of personal responsibility (with associated unconscious concomitant of superiority), though indispensable to the successful prosecution of armed conflict, may, if pressed too far, reach a point when ultimate efficiency and output are threatened. Aside from all idealistic consideration, however, material urges may be no less dangerous. We shall not be surprised if we find that, after several years of unemployment, the skilled artisan welcomes the prospect of work, to say nothing of the opportunity of earning £7 or £8 weekly, even if in turn there is demanded of him continuous overtime and a 70-hour week.

From a study of the case material it is obvious that failures of patients in the series may have been contributed to by factors—personal, individual, constitutional—other than the circumstances of excessive working hours; but such factors—and they are to be found in a proportion of individuals composing any community—may not lead to breakdown unless additional and extreme external stress be applied. It may be that the perfectly adjusted personality would not break down under the conditions described; that in the absence of some constitutional predisposition, or mental conflict such as may derive from underlying discontent or unhappy personal relations, failure is impossible. It is realized that under the sustained and powerful emotional stimulus of a great national cause and effort individuals may achieve levels of performance substantially higher than may be gained in the course of their routine peace-time occupation; in the light of past experience, however, it would seem questionable whether demands so excessive as those described above can be satisfied by workers without jeopardizing, ultimately if not immediately, their total productive capacity, and it is contended that, in the type of case referred to, actual working conditions have been the exciting cause.

It may be argued that these conditions of employment are not obligatory, that the worker who is aware of strain is at liberty to take time off—as, for example, on Saturday afternoon or Sunday. The quality of insight is, however, by no means universal in its distribution, and in practice the inducements, already noted, to working all available hours prove too strong. It may further be objected that a small number of isolated cases referred to a psychiatrist afford an inadequate basis upon which to introduce the problem. There is no disputing, however, the previous scientific findings as to working conditions on the one

hand, and on the other the prevalence of the 70-hour week applied to the armament industry in its various aspects throughout the country.

Conclusion

No attempt has been made in these observations to investigate or discuss the subject from the standpoint of industrial psychology in any scientific way. Nor has reference been made to methods of treatment found effective in the cases concerned. While it is true that in the majority prognosis is favourable, the conditions responding satisfactorily to psychological treatment and general measures, the object has been to call attention to the discrepancy between previous scientific findings as to working hours and conditions of work such as are current industrial practice under the exigencies of our present rearmament programme, and thereby to lay emphasis upon prevention as distinct from amelioration. If the nation is to "stay the course" in the most efficient way possible this problem will require to be looked into, and it is felt that a definite case has been made out as to the urgent necessity for detailed scientific investigation in collaboration with those whose duties bring them in touch with working conditions as they affect large groups of workers. The very demand for supreme national effort is also the argument for the closest study concerning productive capacity in its fullest and most lasting sense. The spontaneous, haphazard, and irrelevant remark of a psychoneurotic patient (a fitter), under treatment for a complaint other than anything connected with his work, may summarize and illumine the importance of this question: "Next week we'll be going on seven days—a 70-hour week. The thought comes to me, 'How long shall I stand up to that? How much shall I damage my resources for the future?'"

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The annual report for 1938 of the National Association for Supplying Medical Aid by Women to the Women of India (Countess of Dufferin's Fund, including the Women's Medical Service) reveals a gratifying increase in the support of this organization while indicating the great amount of work that still needs even more financial and other kinds of help if the intense demand for its services is to be at all adequately met. A very strong case is presented for enlarging hospitals for women and for building new ones. A tour in the North-Western Province, for example, taken at the request of the Inspector-General of Civil Hospitals showed that the women in that Province, as is also the case in other parts of India, are becoming much more "hospital-minded"; the number of maternity patients has more than doubled there in the last few years. The present hospital accommodation is quite inadequate to meet the demand, and the existing hospitals for women are all overcrowded and understaffed. It is gratifying that the unhealthy "purdah" system has been broken down, but there are still very many Indian women who would rather risk death than enter a general hospital, and a still larger number of women who would much prefer to be treated by members of their own sex for their confinements and for special diseases of women. Hospital equipment needs modernizing, and medical and nursing staffs should be brought more nearly up to the standards existing in Great Britain and the United States. Many local authorities seem to be unable to give proper financial support to the hospitals under their administration.

DOES POLIOMYELITIS AFFECT INTELLECTUAL CAPACITY?

AN INVESTIGATION ON 98 CASES

BY

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The question as to how far infections of the central nervous system have any influence on basal intelligence is one which has not been widely explored. In this country Dawson (1931) has investigated a series of cases of chorea in which he found no variation from the normal, and another of encephalitis lethargica in which he demonstrated a progressive deterioration; but, as far as we can discover, no investigation on the effects of anterior poliomyelitis has been undertaken. It might be said that poliomyelitis, being a disease whose chief incidence falls on the anterior horn cells of the spinal cord, was hardly likely to affect intelligence, but it should be remembered that it is now reasonably certain that the path of invasion is by a droplet infection lodging the virus in the post-nasal mucous membrane, whence it travels by the perineural path through the cribriform plate, and so transcerebrally to its subsequent nidus in the anterior horn cells. Furthermore, many cases show at least transient initial cerebral symptoms, which are sometimes of considerable intensity.

Mollaret (1937) in his chronaxial studies of the nervous system sums up certain experimental results on anterior poliomyelitis, which included the introduction of the virus by non-cerebral routes (intraperitoneal, etc.). The interest of this study is that it suggests the existence of a cerebral disturbance occurring before the evident onset of symptoms. Moreover, this disturbance is found as constantly in abortive or asymptomatic cases as in those which develop typical paralysis. It bears witness without doubt to the constancy of a hitherto unsuspected early encephalitic dissemination of the virus. For these reasons it seemed worth while to attempt to determine whether poliomyelitis affects general intelligence, as measured by standard tests, especially as it is not unusual for parents or teachers to express anxiety as to how far this disease may affect the intellectual as well as the physical integrity of the unfortunate victim.

Selection and Testing of the Group

All the cases were derived from those coming under the scheme of the Bath and Wessex Orthopaedic Hospital and clinics, to the surgical staff of which we wish to express our gratitude for allowing us access to them. All children between the ages of 4 and 16 who during the period of investigation were under treatment at the central hospital for the acute stage of poliomyelitis or its residual effects were tested on the Stanford-Binet scale. In order to increase the numbers, and to include cases the onset of whose disease had occurred several years before the tests were applied, a further group was examined at some of the clinics. The children tested were those who

happened to attend on the days of the visits of the psychologist; apart from this there was no selection.

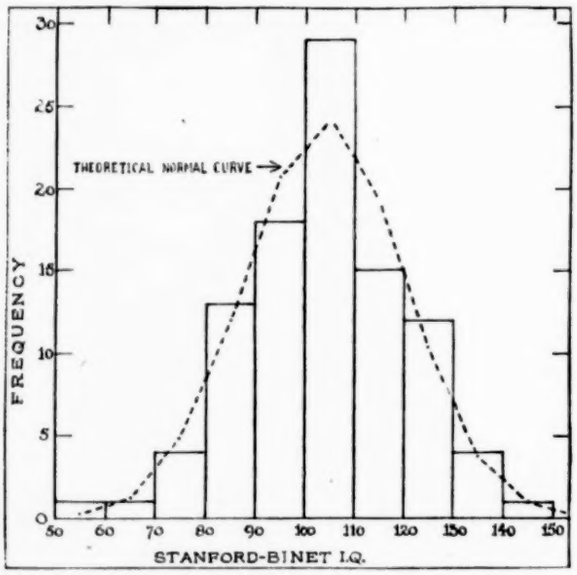
Rather more than a hundred cases were tested, but subsequently this number was reduced to ninety-eight after a very rigid clinical survey with the object of excluding those who did not present unequivocal evidence that their disability was due to poliomyelitis. Some of the cases came from rural areas, others from urban areas, but all were of the economic status represented by the elementary school population. Some had been hospitalized at the onset of the illness; others subsequently, for the purpose of orthopaedic treatment of residual disabilities, whether by operative or other measures; while some had not been hospitalized at all, but had been under observation at the clinics.

Results

The following table shows in somewhat condensed form the Stanford-Binet I.Qs. of the ninety-eight children. The diagram presents the same results graphically.

Binet I.Q.	No. of Cases	Binet I.Q.	No. of Cases
50–59	1	100–109	29
60–69	1	110–119	15
70–79	4	120–129	12
80–89	13	130–139	4
90–99	18	140–149	1

Mean I.Q., 103.91. Standard Deviation, 15.89. (Ungrouped figures.)



The problem is this: Does this sample of children yield the same average result as would a sample of normal children drawn from the general population? Furthermore, does the variability, the spread, of the results indicate a range of variation similar to what would be found in a representative group of healthy children?

The Stanford-Binet scale has been very widely used over many years, and it has been found that an I.Q. of 100 is, in fact, very close to the average I.Q. of the general population. Thus it is clear that the average performance of the present group does not fall below what could confidently be expected from a random group of normal children. A more thorough examination of this point is, however, possible. In recent years a survey of school children, selected by age only, was made in the city of Bath (Roberts and Griffiths, 1937). The city of Bath is a part of the area from which were drawn the patients included in the present study, and represents the most considerable urban district within that area. In view of the fact that it is generally recognized that the mean intelligence in rural areas is somewhat below that in urban areas, it is to be expected that a random sample drawn from the whole area covered by the present study would certainly not yield a sample superior to the previous one.

The Binet testing was carried out by one of us (Ruth Griffiths), who was also responsible for most of the testing in connexion with the Bath survey; such testing in that survey as was carried out by others was standardized in detail to correspond to hers, so that the figures for the two groups are strictly comparable. The mean I.Q. for the Bath school children was 98.8 and the standard deviation 15.2. It will be seen, therefore, that the present group exceeds the Bath group in respect of mean performance, while in variability, as shown by the standard deviation, there is no significant difference.

Actually the present group is significantly higher in mean I.Q. than the previous complete group, but the absolute difference is of course small. The discrepancy may well be due to a difference in age at test. The children composing the present group were considerably younger than those composing the Bath group, and it is known that the Stanford revision is slightly too difficult at older ages and slightly too easy at younger ones (Terman and Merrill, 1937). Small though this effect is, it is probably sufficient to account for the somewhat higher figure yielded by the present group, though that group is too small to permit a demonstration of the slight fall in I.Q. as age increases.

There is therefore very strong evidence that in mean performance a group of children who are suffering from, or have suffered from, poliomyelitis do not fall below the performance that would be shown by a random group of normal children drawn from the general population.

It has already been mentioned that in variability of results, as measured by the standard deviation, the present group does not differ appreciably from the random Bath group or, in fact, from the results obtained by many investigators on school children in various parts of the world. A more precise examination was, however, made, and showed that the distribution of I.Qs., summarized in the preceding table, did not show any significant departure from what would be expected on the basis of the normal curve; this result, too, is what would be yielded by a sample of similar size drawn from the general population. It can be concluded, therefore, that a comparatively large sample, adequate for this discussion, shows clearly that children who suffer from poliomyelitis give just the same average results as do ordinary normal children, and that the variability of the results also, their spread, their range, is simply that of a normal group.

In view of the unequivocal nature of the foregoing results it is of course very unlikely that any subdivision of the children could reveal an association between the level of general intelligence and any special factors. This proved to be the case in regard to all the analyses we have made. The results are set out, accordingly, in very brief form.

1. *Sex Distribution.*—46 girls: mean I.Q. 102.1. 52 boys: mean I.Q. 105.5. The difference is not statistically significant.

2. *Age at Onset of Disease.*—There was no association, as is illustrated by the following table:

Age at Onset	No. of Cases	Mean Binet I.Q.
Less than 4 years	30	104.1
4-7 years	32	103.8
8-14 years	36	103.9
Total	98	103.9

3. *Interval between Onset of Disease and Performance of Test.*—Once again there was no association.

Interval between Onset of Disease and Test	No. of Cases	Mean Binet I.Q.
0-11 months	21	104.5
1-4 years	38	103.7
5-15 years	39	103.8
Total	98	103.9

Thus there is no evidence either of a depression of intelligence which passes off or of a depression which is produced by the after-effects during the years of childhood.

4. *Occurrence of Clinically Recognizable Cerebral Symptoms at Onset of Disease.*—Group 1: None; 60 children. Group 2: Minor symptoms; 22 children. Group 3: Pronounced symptoms; 16 children.

Group	No. of Cases	Mean Binet I.Q.
1	60	103.4
2	22	105.4
3	16	103.8
Total	98	103.9

The occurrence of cerebral symptoms is therefore of no subsequent significance in regard to the level of general intelligence.

Conclusion

This study shows that an attack of poliomyelitis does not, either at the time or subsequently, depress the level of general intelligence as estimated upon the Stanford-Binet scale. The anxious parent may therefore be reassured so far as basal intelligence is concerned, but two other points must be kept in mind by the physician. In the first place the child affected by poliomyelitis may be absent from school for long periods; unless provision is made by home tuition or, as is done in orthopaedic hospitals, by the provision of special educational facilities, his educational achievement may be very much behind that of his contemporaries, even though his basal intelligence is not affected. Secondly, the child crippled by poliomyelitis may, unless care is taken, develop emotional reactions to his environment which may result in serious personality maladjustments; these may determine definite educational backwardness simulating true mental retardation.

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THE PREVENTION OF DEFAULTING FROM V.D. TREATMENT CENTRES

BY

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With the recent advent of the new chemotherapeutic methods of treating gonorrhoea there is likely to be a considerable increase of "defaulters" from the venereal disease treatment centre. Defaulters are patients who cease to attend before all the necessary treatment has been given or before the complete tests of cure have been performed. In addition, many will not seek medical aid. They will depend on a limited amount of self-administered chemotherapeutic treatment. Consequently, these patients receive no thorough tests of cure. Should this tendency be allowed to develop an increase of venereal disease is possible. Methods of dealing with the question are discussed below and an analysis of male defaulters at the Leicester V.D. centre follows.

Public V.D. Lectures

The education of the public on the dangers of venereal disease is now an important part of the V.D. scheme in Leicester. It may be of value to record some of the results. Two periods of six years are compared—1926 to 1931, and 1932 to 1937 inclusive. During the first period practically no propaganda was conducted.

At first some people opposed the idea of public lectures on such a subject. Indeed, the term "venereal diseases" was avoided in the public notices which advertised the lectures in 1932. The bills displayed on trams and buses, in factories, in public lavatories, and in the police headquarters and St. John Ambulance headquarters were headed "Lectures on Social Hygiene." In 1933, however, it was considered that even the term "venereal diseases" could appear in public notices. The popularity of the lectures was apparent from the beginning, the lecture halls being crowded. Each lecture, with lantern slide demonstration and discussion, lasted about two hours. I preferred my own set of lantern slides to an obviously acted film. The discussion which followed always proved valuable. Questions had to be stopped after some sixty minutes, otherwise they would have gone on for most of the night. Those asked were surprisingly intelligent, as the following examples show.

Can a person get venereal disease from a lavatory seat? Can one get venereal disease from domestic animals? Does a woman necessarily know when she has venereal disease? Can a man get venereal disease from having sexual intercourse with a woman when her period is on? Does circumcision prevent venereal disease? What is the speaker's opinion on masturbation? Is it always certain that a man will contract venereal disease should he have connexion with a woman who is known to have it (no preventives being used)? What is the speaker's opinion on prostitution? Why do we not educate the public more than we do on the dangers of venereal disease? Why not instruct the civilian population on preventive measures? Should young people contemplating marriage have tests for venereal disease? Is there any danger of contracting venereal disease from blood transfusions? Can venereal disease of the testicle follow a kick on that part? What is meant by "whites"?

After one of the earlier public lectures I was accused of making it appear that venereal disease could be cured too easily. It was argued that I was encouraging promiscuity. My accusers, however, represented only a few of the extremely narrow-minded. Those accusations were made a few years ago and are now forgotten. I wonder what effect the newer chemotherapeutic methods of treatment will have on promiscuous sexual intercourse. Already the "new tablets" have been claimed to be antivenereal, contraceptive, aphrodisiac, and abortifacient (!).

In public lectures on venereal diseases special reference must be made to the non-venereal patient. Attendance at

a V.D. centre does not necessarily indicate venereal disease. Every effort should be made to remove the stigma associated with attendance at a V.D. department. The designation "special department" would be better than "venereal disease department." Some centres do use the better term. The importance of the infected patient attending until the completion of treatment and tests of cure must also be stressed. Quite often patients, perhaps defaulters, attend these lectures. It sometimes happens that a few advanced syphilitic patients are present. A ray of hope and encouragement can be of value to them.

Communication with the V.D. Defaulter

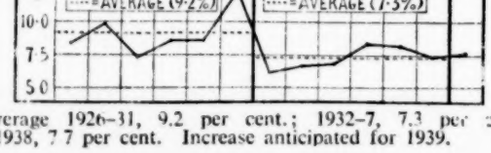
Compulsory notification and treatment of venereal disease is not in force in England at the present time. Some authorities believe that a modified form of compulsion should exist, others believe in strict secrecy and free treatment centres. Under the present arrangements confidence between patient and venereologist must be rigidly kept. We do, however, ask the patient if he has any objection to our writing him should he default. Invariably no objection is given. Of course it is explained that any letter sent will be non-committal in character, not revealing the nature of the complaint or the department attended. Some patients return on receiving such a letter. In other instances the letter is ignored or is returned marked "Not found." A few centres now employ a trained social service worker or almoner to follow up defaulters. I believe that an almoner specially trained for this type of work may be useful for women and children. At the present time I am against the practice of employing an almoner for male cases. The specially trained almoner, usually a lady, no matter how tactful, may inadvertently be responsible for other members of the household getting to know that the son or husband is attending the V.D. centre. The average male patient would not feel that secrecy was in force if a social worker attempted to call on him.

Co-operation between V.D. Officer and General Practitioner

Confidential medical reports between the V.D. officer and the patient's own doctor do not in any way constitute a breach of confidence. It is the practice at this centre to give a written report to the doctor who sends the patient to the V.D. department, and also a final report when cured. Approximately 20 per cent. are referred to us from their own doctor. The general practitioner can often give valuable assistance in persuading contacts or possible congenital patients to attend.

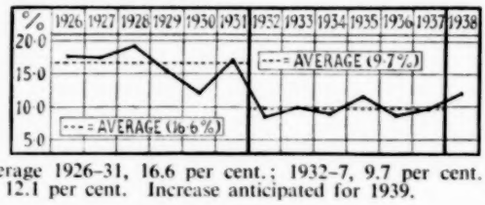
As a result of the chemotherapeutic treatment of gonorrhoea, co-operation between the general practitioner and the venereologist will in future be more important than ever. There is a tendency to give insufficient dosage of the sulphonamide derivatives in acute urethritis and not to follow treatment with the necessary tests of cure. Some cases fail to respond to the newer methods and require additional treatment. The irrigating outfit will still play its part. The complete tests of cure, including urethroscopic examination, sounds, routine blood tests, and prostatic smears, are as essential as ever. Indeed, as a result of late relapses appearing I believe that the observation period should be extended. Some of the spectacular "cures" met with are not so wonderful as at first imagined.

Graph 1.—Yearly percentages of male gonorrhoeal cases on the records who defaulted before completion of treatment. A serious type of defaulter.



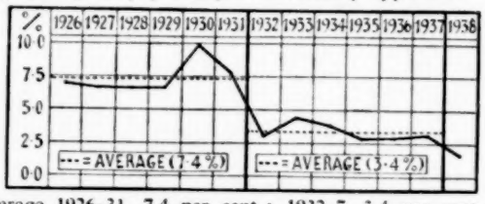
Average 1926–31, 9.2 per cent.; 1932–7, 7.3 per cent.; for 1938, 7.7 per cent. Increase anticipated for 1939.

Graph 2.—Yearly percentages of male gonorrhoeal cases on the records who defaulted after treatment but before tests of cure were completed.



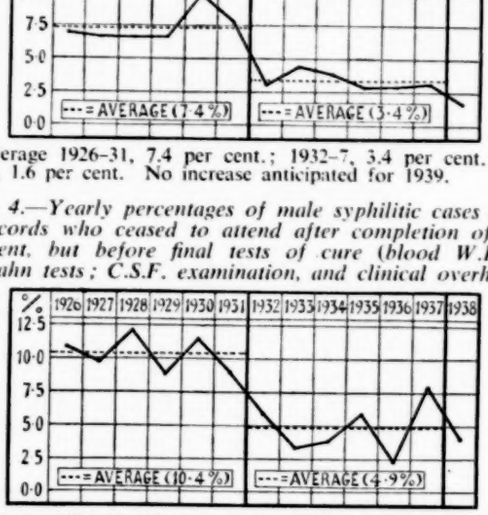
Average 1926–31, 16.6 per cent.; 1932–7, 9.7 per cent.; for 1938, 12.1 per cent. Increase anticipated for 1939.

Graph 3.—Yearly percentages of male syphilitic cases on the records who ceased to attend before completion of one course of injections. A serious type of defaulter, especially if originally primary or secondary syphilis.



Average 1926–31, 7.4 per cent.; 1932–7, 3.4 per cent.; for 1938, 1.6 per cent. No increase anticipated for 1939.

Graph 4.—Yearly percentages of male syphilitic cases on the records who ceased to attend after completion of treatment, but before final tests of cure (blood W.R. and Kahn tests; C.S.F. examination, and clinical overhaul).

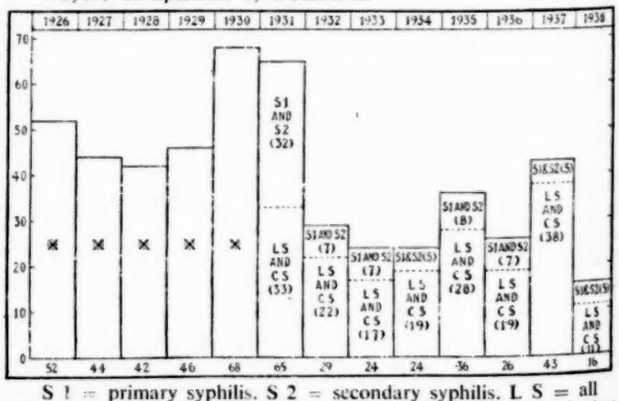


Average 1926–31, 10.4 per cent.; 1932–7, 4.9 per cent.; for 1938, 4.1 per cent. No increase anticipated for 1939.

Graph 5.—Yearly percentages of male syphilitic cases on the records who defaulted before completion of treatment.

Average 1926–31, 16.8 per cent.; 1932–7, 9.6 per cent.; for 1938, 4.3 per cent. No increase anticipated for 1939.

Graph 6.—Analysis of male syphilitic cases who defaulted before completion of treatment.



S 1 = primary syphilis. S 2 = secondary syphilis. L S = all later stages. C S = congenital syphilis. * = all stages (not classified).

Detailed Analysis of Male Defaulters

The six graphs are self-explanatory. They show how the male defaulters at Leicester V.D. centre have varied in the two periods considered in this article. During the first (1926–31) no public lectures were given, while in the second (1932–7) extensive propaganda work and other methods of reducing defaulters were carried out. The defaulters for the year 1938 are also given.

Conclusions

I have no doubt that public lectures on venereal diseases are of value. Certainly we have a few undesirable syphilophobic and gonophobic patients appearing at the clinic after attending a lecture, but this disadvantage is outweighed by the return of defaulters and the attendance of the early infected case.

The graphs given above show that we in Leicester have had a considerable fall in the percentage of defaulters. Two types of gonorrhoeal defaulters dropped from an average of 9.2 to 7.3 per cent., and from 16.6 to 9.7 per cent. respectively. Three types of syphilitic defaulters dropped from an average of 7.4 to 3.4 per cent., from 10.4 to 4.9 per cent., and from 16.8 to 9.6 per cent. This decrease is to some extent due to public lectures.

The confidential letter to defaulters is also responsible for a number returning to the clinic.

Close co-operation between general practitioner and the V.D. specialist is most important, especially in view of the tendency to default at an early date after treatment with the sulphonamide derivatives.

Summary

Methods of reducing defaulters from V.D. treatment and of encouraging patients to attend the treatment centre are considered from the point of view of public lectures, communication with the defaulter, and co-operation between the V.D. officer and the general practitioner.

The results of the adoption of these measures at Leicester are given.

A detailed analysis of male defaulters at the Leicester V.D. centre follows.

Clinical Memoranda

Acute Duodenal Obstruction in a Boy of 8 due to Volvulus of "Volvulus Neonatorum" Type

The following case seems interesting and rare enough to warrant publication.

Case Report

A boy aged 8 was admitted to hospital as a case of suspected appendicitis on February 3, with the following history. On January 8 his doctor was called because he was suffering from abdominal pain and had vomited several times. When seen his pain was not severe, but his parents said he had been in agony during the night. They suggested the pain was due to the fact that he had been to a children's party two days before and had eaten a quantity of nuts. There was no abdominal tenderness, and the boy soon felt better. On January 25 he again vomited twice, but made no complaint of pain. On January 28 he had violent abdominal pains in the night and vomited many times, the vomit being at first yellow and later green. He recovered, but had another attack on January 31. On February 2 his doctor was again called as the boy had pain in the night. When seen he was not distressed and his pulse and temperature were normal, as they had been in the previous attacks. On February 3 his pulse rate rose to 110, he was tender over the appendix area, and he was sent into hospital.

When I first saw him in hospital he was lying comfortably in bed without any pain. His abdomen was somewhat distended, but there was no tenderness, the temperature was 99.2°, and the pulse 104. There was no tenderness on rectal examination. Two hours later the clinical picture was entirely different; the child was in extreme agony, crawling over the bed on all fours, screaming with pain, and rubbing his umbilical region. It was quite impossible to examine him; he was vomiting large quantities of dark green fluid. Although I could not make a definite diagnosis, his symptoms were so urgent that I decided to operate at once.

Under general anaesthesia the abdomen was opened through a paramedian incision. The whole of the small intestine below the duodenum was found to be completely collapsed and empty. The appendix was 8 inches long, but otherwise normal. There was a Meckel's diverticulum 4 inches long and the thickness of a little finger. This was causing no trouble but was removed. The stomach and duodenum were hugely dilated as far as the crossing of the superior mesenteric vessels over the third part of the duodenum. The caecum and the hepatic and splenic flexures of the colon were unduly low in position and provided with a mesentery. The rotation of the gut, however, had been normal to the extent of the caecum being on the right side, although proper fixation had not occurred. Two or three coils of small intestine were encircling the caecum and ascending colon, and gentle traction on the proximal coil tightened these coils like a knot round the large gut. At this stage the patient became extremely cyanosed because vomiting occluded the air-way. The head of the table was tilted down about 30 degrees, a stomach tube was passed, and two pints of green fluid removed, the patient's condition improving immediately. It was now possible to unravel the knots in the intestine, chiefly by rotating the caecum in a clockwise direction. Normal saline was then poured into the peritoneal cavity and the abdomen closed. On the next day there was a certain amount of abdominal colic, which was relieved by eumydrine tablets. The bowels had not been opened for some days, so an enema was given; these had to be repeated at intervals for a month.

A rather stormy convalescence included chest infection, probably from aspirated stomach contents during the anaesthesia. This was treated by sulphapyridine, but the boy's tolerance to this drug was very poor; it soon caused vomiting, and had to be stopped. However, he gradually and steadily improved and was about to be discharged when, together with several other patients in the ward, he developed scarlet fever. This was his final setback, and he was last seen walking about the town looking happy and well.

There have been no abdominal symptoms since the operation was performed some months ago, and I hope, perhaps fondly, that there was enough peritoneal reaction at the site of the volvulus to cause fixation of the ascending colon and so prevent recurrence of the condition. A barium meal and *x*-ray investigation subsequent to the operation showed no abnormality except the low position of the hepatic and splenic flexures of the colon.

The interesting aspects of the case are: (1) The "volvulus neonatorum" syndrome occurring at the age of 8. (2) The complete collapse of the whole of the small gut, including that taking part in the volvulus. This collapse was due to the obstruction of the third part of the duodenum by the twisting and traction of the "duodeno-colic isthmus." (3) The occurrence of several acute attacks with symptomatic recovery between them. (4) The agonizing pain caused by the condition, which was commented on by all who saw the boy during an attack, yet half an hour later there would be very little abnormality to observe.

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Dr. Jerger best: game, set, and match to him. After this promising beginning he develops his real thesis, that (in the U.S.A.) there is too much specialization and not enough respect paid to the general practitioner. Incidentally, his account of his medical studies in America makes one wonder, not that there should be an occasional incompetent doctor over there, but that there should be an occasional competent one. His professional autobiography is full of amusing yarns; but how much of it is a leg-pull, on the pattern of the opening pages, passes the wit of at least one Englishman to guess. It is to be hoped, at any rate, that he is overstating his case when he declares that three-fifths of the recruits inspected for the U.S.A. Army during the war were infected with venereal disease.

The fact that a second edition of *Bacteria in Relation to the Milk Supply* by C. H. Chalmers (Arnold, 6s.) has been called for within four years shows that this little work is filling a useful place in the field of dairy bacteriology. Substantial alterations have been introduced into the new edition so as to deal more fully with such subjects as the methylene-blue reduction and the phosphatase tests. It may be noted that the temperature at which the water-bath used in the official method of performing the methylene-blue reduction test is given erroneously as 37° ± 0.5°; the correct figure is 37.5° ± 0.5°C. Similarly the preparation of the control tubes differs from that laid down in the official order. The section on water examinations is based on the original edition of the Ministry of Health's Report No. 71. A new edition of this report, which readers by Chalmers's work would do well to consult, has just been published in which considerable alterations are recommended. Incidentally, Fildes spells his name with an "s."

Poisonous Plants of the United States by Professor W. C. Muenscher is a volume in a series on rural science which covers a wide variety of aspects of agriculture. The author classifies the poisonous plants in two main groups: those which are poisonous under all conditions and those which are poisonous under special conditions. The second group is of considerable medical interest. It includes the plants causing dermatitis (about 100 listed), those causing photosensitization, and cyanogenetic plants, etc. In this connexion a relatively new danger has been recognized: certain plants can absorb selenium compounds in large enough quantities to make them poisonous to animals, and this has been established as the cause of "alkali disease" and "blind staggers" in cattle and horses in areas where seleniferous Cretaceous or Eocene shales occur. The main part of the volume consists of a description of poisonous plants classified according to their natural orders, and the text is followed by ten pages of references. In general the volume gives a brief but competent account of a subject which is of primary importance to agriculture and also presents many problems of general pharmacological interest. It is published by Macmillan at 15s.

Volume III of *Thorpe's Dictionary of Applied Chemistry* (fourth edition) covers subjects from Chemical Calculation to Diffusion. It is published by Longmans, Green and Company at 63s. A considerable proportion of the volume deals with subjects of medical interest—for example, chloroform, choline compounds, cinchona alkaloids, cocaine, cod-liver oil, creatinine. The article on cod-liver oil deserves special mention, for it gives a particularly clear account of the history, preparation, and properties of this drug. Chemical warfare and chemical warfare defence are two subjects of topical interest that together occupy sixteen pages. Some interesting facts mentioned are that the content of gas as per cent. of total weight is about 50 in the case of air bombs as compared with 10 in the case of shells. About fifty different compounds are described. The most potent toxic agent appears to be diphenyl cyanoarsine, which is used in the form of a smoke and acts as a lung irritant in a concentration of one part in 170 millions. In relation to chemical defence it is mentioned that activated charcoal is still the basic constituent of most respirators, but the introduction of smokes has called for the addition of a filtering mechanism.

May's Chemistry of Synthetic Drugs first appeared thirty years ago and has now reached its fourth edition (Longmans, Green, 21s.). It is seventeen years since the third edition was published and the text has been almost completely rewritten by Dr. Percy May and Dr. Malcolm Dyson. The new volume includes synthetic vitamins and endocrines. Though the number of new synthetic drugs which are introduced into clinical practice is large it represents a very small proportion of the total number of compounds investigated, and this volume, which is of moderate size (370 pages), only covers a small part of the field. The material has, however, been selected with care, and the authors give an interesting survey of an important and rapidly advancing subject.

Writing on *Le Syndrome "Hémorragie du Nouveau-Né"* (Masson, 26 fr.), Dr. H. Jahier has allowed himself to be influenced too much by his medical teachers' views on congenital syphilis, for he spoils an otherwise excellent monograph on an important and interesting subject by concluding that this infection is the only complete explanation for the various manifestations of the syndrome. Fortunately he still believes that the supply of adult blood to the infant constitutes the essential part of treatment, although his choice of the longitudinal sinus, approached at the site of the posterior fontanelle, will not commend itself to workers in other countries, who find the majority of infants with this malady are cured by intramuscular injection.

Die Eiweisskörper des Blutplasmas, edited by Drs. H. Bennhold, E. Kylin, and Professor Rusznyak, is published by Theodor Steinkopff. It contains articles by various authors from Germany, Hungary, Sweden and Denmark. The first half of the volume deals with the physical chemistry and biochemistry of the proteins of blood plasma and the second half with chemical problems. Professor Rusznyak gives a short but clear survey of the difficult problems associated with oedema. He shows that lowering of the colloid osmotic pressure of the serum is one important factor in the production of this complex condition. The volume concludes with a general review by Dr. E. Kylin of the clinical importance of plasma proteins. He explains that the present work is in the nature of a survey of existing knowledge, and has been compiled with the intention of stimulating and assisting further research in this very difficult but important field.

Preparations and Appliances

POLYVALENT VITAMIN CONCENTRATE

Abecedin (Messrs. H. R. Napp Ltd.) is the name of preparations containing vitamins A, B_1, B_2, C, and D_3. This mixture is supplied in tablets and as an emulsion.

Polyvalent vitamin concentrates provide a very convenient method for the prevention or treatment of vitamin deficiency. The chief difficulty is to produce such mixtures in a stable form. The vendors state that control specimens of their tablets showed no appreciable deterioration in vitamin content after storage for two years. They point out that this applies to unopened packages, and that deterioration by air contact may occur after the bottle has been opened.

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THE PURSUIT OF LONGEVITY

The will to live, the quest for longevity, is the most deeply rooted and persistent of the biological characteristics of protoplasm organized into human individuals. In one of the lectures before the New York Academy of Medicine, published in a recent collection,[1] Professor Raymond Pearl points out that though at the beginning of each person's life this urge to survival is wholly unconscious—just a part of living like digestion or respiration—later on this underlying protoplasmic will to live, the vital momentum, is supplemented in the individual by a conscious search for longevity. Virtually all who live to seventy years and upwards think of little else but about what they should do to preserve their health so that they may keep on living longer. The octogenarian or nonagenarian may be in wretched health and altogether having a bad time of it, but even so his normal instincts are for keeping on. For the consideration of the chances of survival of an individual, and of the means by which these may be increased, statistical methods of examination of life tables are used. Professor Pearl illustrates the function of survivorship of individuals of various ages in the form of a ladder of life, broad based and tapering at the top to which the individual is trying to attain. By comparison of present-day statistics with the life tables of the United States at the end of last century two interesting facts emerge. In the last fifty years or so the prospects for duration of the journey of life have much improved; but it is the average duration of life that has been altered, and this has been accomplished through progress in medicine and improvement in the public health, chiefly in the lowest of first ten-year period. In 1890 only 72 per cent. of boy babies in the United States reached ten years of age; now 91 per cent. do. The span of human life has not been altered, however, and there is no present prospect that it soon will be. Because more get over the early and very difficult stages, absolutely more survive at later ages; but those who attain the age of seventy now actually do not do so well relatively, on the average, in the way of further survival to still higher ages as did the stalwarts of 1890.

The problem of the search for longevity involves attempting to answer the question why it is that some individuals alive at any given age will live thereafter longer than others. The shrewd general impression of a wise physician who spent his own life in a region where longevity was a common phenomenon, Dr. Oliver Wendell Holmes, is summed up in the often-quoted assertion that if one is setting out to achieve threescore years and twenty, the first thing to be done, some years before birth, is to advertise for a couple of parents both belonging to long-lived families. Professor Pearl is able to support this impression by the results of exact quantitative investigation. From these it emerges that people who live to a great age have immediate ancestors (parents and grandparents) who are on the average definitely longer lived than the corresponding ancestors of the general run of the population; and, further, this hereditary influence promoting longevity is between two and three times as great relatively for parents as it is for grandparents. The importance of inheritance is emphasized by comparing statistics of long-lived as against short-lived children and finding that the long-lived children had fathers who lived much longer than the fathers of short-lived children. Corresponding life tables for mothers tell the same sort of story. Further, in another series the expectation of life of the sons of fathers who died young is less than that of the sons of moderately long-lived fathers and still less than that of the sons of extremely long-lived fathers.

Besides the inherited biological constitution of each individual, which is one of the major factors in the probable length of life of the person and which appears to be associated with a number of structural and physiological characteristics that are being slowly determined, there must of course be environmental aspects of the picture. The factors of use of alcoholic beverages and of tobacco have been investigated. One of Professor Pearl's studies published in 1926 led to the conclusion that moderate drinking does not significantly shorten life when compared with total abstention from alcohol, while heavy drinking does seriously diminish the length of life. And as a result of a hitherto unpublished series of investigations of a group of nearly 7,000 men the conclusion is reached that smoking tobacco is definitely associated with an impairment of life duration, and that the amount or degree of this impairment increased as the habitual amount of smoking increased. Further statistics appear to throw light on the question whether hard physical labour tends to shorten life. Apparently before the age of forty is attained it makes no difference in the rate of mortality whether the occupation involves light or physical labour. After roughly the age of 40–45 it seems that a man shortens his life by definite amounts in proportion as he performs physically heavy labour.

The literature of longevity is full of advice, recipes, and precepts for the attainment of length of days.

[1] *Landmarks in Medicine. Laity Lectures of the New York Academy of Medicine.* By various contributors. Introduction by James Alexander Miller, M.D. London: D. Appleton-Century Company. (8s. 6d.)

Reviewing the professor's figures in order to seek some broad generalization for individual guidance, in only one outstanding respect besides great longevity did the long lives differ from the rest of mankind on the whole. That is in the fact that a vast majority of these extremely old folk were of a placid temperament, not given to worry: they had taken life at an even, unhurried pace. For a variety of forms—including plants, various lower animals, insects, and men—the length of life is generally in inverse proportion to the rate of living.

RURAL HEALTH ORGANIZATION

The League of Nations had arranged for a European Conference on Rural Life to be held at Geneva in October this year. In preparation for this the League prepared a number of publications in pamphlet or booklet form described as "general technical documentary material." Among them are several which deal with nutrition and rural housing, and two which have a direct and important bearing upon medical services. One is a *General Survey of Medico-social Policy in Rural Areas*, issued by the League's Health Organization,[1] and the other deals with *Sickness Insurance and Rural Medical Assistance*, and is issued by the International Labour Office.[2] The two documents are closely connected one with the other, and they contain information and conclusions of great interest to all who have any concern with social medicine. Many of the facts set out and problems discussed have to do with medical organization and services in general, and not merely with those of rural areas; but it is made clear that the circumstances of rural and agricultural populations give rise to peculiar needs, require special adaptations, and certainly call for the provision of health and medical services to no less extent than that now so widely given to industrial communities. This is true even of England, Belgium, and Holland, where the population lives mainly in towns, and of Switzerland and the Scandinavian countries, where the peasant population represents a larger proportion but where farms and rural dwellings have, speaking generally, modern equipment. Still more is this the case in other countries, including parts of Scotland, France, and Germany, where there is a relatively large but scattered agricultural people farming along traditional lines.

It is satisfactory to discover from a survey which includes all these varying conditions that the provision of health services and medical care now established in Great Britain is, so far as it extends, second to none in quality and effectiveness, and that the proposals made by the British Medical Association in its scheme for a General Medical Service for the Nation are almost exactly those which international experience and thought indicate as the most suitable and efficient, and this not merely in regard to the nature of the professional service but also in regard to the main executive and financial arrangements suggested for its administration. Adaptability to local conditions within reasonable limits must be an essential feature of all such schemes. It is possible, within Great Britain, that the conditions in England and Wales on the one hand and Scotland on the other differ sufficiently to make somewhat diverse administrative, or even financial, arrangements advisable. Indeed, at present, as is well known, there are two different systems of medical provision operating within Scotland itself. In some countries it has been found possible to include hospital provision within an insurance scheme; with us such provision has developed, and is developing, on different lines, which seem to prevent such inclusion but allow of a very close association being formed with other medical services in accordance with the B.M.A. plan. Consultant and specialist services are evidently best supplied along with institutional care. In some countries, too, "insurance institutes" (an analogue of our "approved societies" but by no means identical therewith) have been given fairly wide powers in relation to public health, whereas here we shall no doubt continue to look to local health authorities for this purpose. But as to the best method of financing and arranging the collective organization of medical care the Health and Labour Offices of the League of Nations have no doubt. The insurance method has pronounced advantages over any other, including that of entrusting it to practitioners appointed and paid by public authorities; and of the several kinds of insurance schemes that of compulsory sickness insurance for wage earners, their families, and others of similar economic position is to be preferred. It is the scheme which has been most commonly adopted and is working well.

Two other conclusions may well be noted. One is the essential value of properly conducted popular education in health. The other is the need for training the medical profession for the accomplishment of its preventive and social duties. A well-expressed paragraph on this matter is worthy of quotation:

"Doctors who have been practising for twenty years or more have only received training in the purely technical aspects of hygiene. Although the scope of instruction has been broadened, it remains true that faculties of medicine, the medical press, medical associations, and the profession itself still concentrate on laboratory research, refinements of diagnosis, and new methods of treatment. The preventive and social aspects of medicine are no longer ignored, but little more is done than to make passing reference to them. They still do not permeate teaching nor figure prominently in university examinations, press articles, papers read to learned societies, or debates in

[1] *General Survey of Medico-social Policy in Rural Areas*. Prepared under the auspices of the Health Committee. Series of League of Nations Publications. European Conference on Rural Life, 13. London: Allen and Unwin. (1s.)

[2] *Sickness Insurance and Rural Medical Assistance*. Prepared by the International Labour Office. European Conference on Rural Life, 15. London: Allen and Unwin. (9d.)

professional circles. At the same time it is being realized that doctors have to concern themselves not only with the fate of sick persons but also in that of the community as a whole. Medical students must therefore be given a better understanding of their future preventive and social duties, while practitioners should be brought to realize that they represent the main line of defence of the health of the community."

THERAPEUTIC REQUIREMENTS IN WAR

Before the outbreak of war large stocks of drugs and therapeutic substances had been accumulated in this country, and the arrangements made by the Government are designed to secure that these stocks should be augmented as required. The British Pharmacopoeia Commission is already engaged upon modifications of the formulae of the *British Pharmacoepia* to meet the exigencies of war time, and subsequently revisions may be expected of the *British Pharmaceutical Codex* and the *National Formulary* for national health insurance purposes. In the meanwhile, owing to the strain imposed upon medical services and the country by the outbreak of war, the utmost economy is necessary in the prescription of drugs. As briefly announced in our last issue, the Medical Research Council, at the invitation of the Ministry of Health, has formed a Therapeutic Requirements Subcommittee to advise the Ministry and the medical and the pharmaceutical professions on matters relating to economy in the use of drugs. Where several variants of a particular drug are known, or where there are several remedies for a particular disease, it may be desirable, on grounds of economy, to concentrate upon the manufacture of a single preparation or compound. The raw materials which go to the making of many therapeutic substances are imported from abroad. In the case of other substances supplies available for the medical profession may be diminished by reason of an abnormal demand from other essential services. The newly appointed subcommittee will endeavour to ensure the most effective and most economical use of drugs and therapeutic substances, bearing in mind these and other considerations. The full co-operation of all medical practitioners is needed in order to prevent waste in dispensing. All communications with regard to the work of the Therapeutic Requirements Subcommittee should be addressed to Dr. C. H. Hampshire, 44, Hallam Street, London, W.1.

CHEMOTHERAPY OF MALARIA

Contributions to the already extensive literature on the control and treatment of malaria by drugs appear with increasing frequency, and demonstrate the clinical research which is going on continuously among workers in tropical medicine. Just over a year ago we discussed in these columns[1] the findings reported by the Health Organization of the League of Nations,[2] and the broad conclusion was that there was no drug which was capable of acting as a certain and practical causal prophylactic agent against malaria. Field,[3] from the Federated Malay States, confirms that this is still the general position, but his work and that of others indicate that although the chemotherapeutic control of malaria is not yet in sight, the signs are by no means discouraging. Sinton, Hulton, and Shute[4] have shown that sulphanilamide is capable experimentally of preventing infection with *P. falciparum*, but although this is of considerable chemotherapeutic interest it has, as yet, no direct practical application. Plasmoquine, which is peculiarly lethal to sporozoites, can only act as a prophylactic in doses bordering on the toxic. This does not mean that all drug treatment aimed at preventing malaria is necessarily useless, although Field appears to doubt whether under the conditions obtaining in Malaya any adequate form of mass chemoprophylaxis is feasible. Atebrin prophylaxis gives more effective control of malaria than does quinine, but the continuous administration of atebrin is hardly justifiable until more is known of its ultimate effects on the human system. Quinine appears to be without serious side effects, but its regular daily administration to large population groups in Malaya is difficult to organize, and it is less effective when given at greater intervals. On the other hand, in Italy and Algeria quinine prophylaxis is regarded as a malarial control measure of great practical utility. Although experience attests to the prophylactic effect of quinine or atebrin, under suitable conditions, in preventing infections reaching a level where clinical symptoms are produced, such infections are not necessarily eradicated, as is shown by the rise in parasite rate and by the fever which follows withdrawal of the drugs. For the treatment of the acute attacks quinine or atebrin are the drugs of choice; the daily administration of 2 grammes of quinine or 0.3 gramme of atebrin in three divided doses suffices to clear the parasites within a few days, but unfortunately relapses are not infrequent. Plasmoquine, however, which is of little value itself in the actual control of the acute attack, is said to diminish the incidence of relapse when associated with the quinine or atebrin treatment, and it is also an effective gametocidal agent against the crescents of *P. falciparum*, which are relatively unaffected by the other two drugs. Smith,[5] Lipscomb,[6] and Boyd[7] recently drew attention to the effect of plasmoquine combined with atebrin in diminishing relapses. In 1934 the Malaria Treatment Centre at Kasauli, to which were sent the recurrently relapsing cases of malaria, was closed for want of material, and Boyd attributed this result to the effect of plasmoquine treatment. On the other hand, Whittingham[8] stated that, although it was agreed that the new synthetic drugs reduced the relapse rate, the low rates observed by Smith, Lipscomb, and Boyd were only true up to a period of about three months after treatment was started, and that if the patients were watched for longer periods 20 to 25 per cent. relapsed. In practice Field appear to prefer to give plasmoquine

[1] *British Medical Journal*, 1938, **2**, 227.
[2] *Bull. Hlth. Org. L.o.N.*, 1937, **6**, 895.
[3] *Bull. Inst. med. Res.*, F.M.S., 1938, No. 2.
[4] *Ann. Trop. Med. Parasit.*, 1939, **33**, 37.
[5] *Proc. roy. Soc. Med.*, 1939, **32**, 1077.
[6] Ibid., 1082.
[7] Ibid., 1085.
[8] Ibid., 1085.

after the other drugs, and while most will agree with this in the case of atebrin, many use quinine and plasmoquine simultaneously, as this shortens the course of treatment and appears to be without undue danger from increased toxic effects. The remarkable activity of the sulphonamide compounds in bacterial infections naturally leads to their being tried against other organisms, but so far as human malaria is concerned Niven's[9] conclusion concerning prontosil appears sound—namely, that although it had some lethal action on malarial parasites, especially *P. falciparum*, it had no place in the practical treatment of malaria owing to its low efficiency, possible toxicity, and relatively high cost. On *P. knowlesi*, however, a parasite of simian malaria, sulphonamide compounds — namely, soluseptasine, prontosil, and particularly sulphapyridine—have a remarkable action, as shown by Chopra and Das Gupta.[10 11 12] A number of other dissimilar compounds are capable of exerting some therapeutic effect in malaria. The action of arsenobenzol against *P. vivax* is well known, and Glyn-Hughes, Lourie, and Yorke[13] have shown this same infection to be susceptible to the action of undecane diamidine.

THE MECHANISM OF DIABETES INSIPIDUS

The association of the hypothalamus and the pituitary gland with the control of water metabolism has been shown by the study of pathological material obtained from cases of diabetes insipidus in man and the production of the syndrome in experimental animals. The control of the enormous polyuria in human beings by injections of pituitrin is paralleled by the similar control secured in experimental polyurias. The existence of an antidiuretic substance or hormone in the posterior pituitary is well established, but the precise mechanism responsible for the diuresis itself is not clear. There is evidence that the anterior pituitary must somehow be involved and also that it possesses a diuretic substance. The importance of the anterior pituitary in this connexion was first emphasized by von Hann over twenty years ago. It has always been significant that, whereas removal of the posterior lobe leads to polyuria, lasting polyuria never follows total hypophysectomy. In a recent paper Biggart and Alexander[14] report a series of experiments on diabetes insipidus induced in dogs. Small localized lesions 1 to 2 mm. in diameter were carefully produced with the diathermy needle in selected regions of the hypothalamus. Out of forty-nine animals thus treated, fourteen died as a result of the operation, thirteen developed a transitory post-operative polyuria, fourteen developed a condition of experimental diabetes insipidus, and six showed no change in urinary output. Detailed histological study of the lesions showed that if they were unilateral no polyuria resulted. The effective lesions were bilateral and in the anterior hypothalamus, the supra-orbital nuclei were destroyed, and in the majority of cases the lesions were so placed that any fibres running from the nuclei paraventriculares to the supra-optic nuclei were severed. As a result of the lesions the posterior lobe became atrophied, but the pars intermedia and the anterior lobe were not affected. The polyuria produced by these hypothalamic lesions was complex and had three distinct phases: a primary phase of transient polyuria lasting from one to six days; a secondary phase of return to normal urinary output; and a final tertiary phase of persistent polyuria simulating diabetes insipidus lasting apparently indefinitely. The daily urinary output in the different phases was, in round figures: pre-operative 500 to 600 c.cm.; primary phase 1,500 to 3,500 c.cm.; secondary phase 500 to 600 c.cm.; tertiary 1,500 to 3,500 c.cm. In the tertiary phase of established polyuria the animals were quite healthy and there was no apparent reason why they should not have continued to old age. Injection of pituitrin in this phase invariably reduced the urinary output to normal, but the primary phase was unaccountably resistant to such treatment. Thyroid, in doses having no effect on the urinary output of normal dogs, increased the polyuria of the tertiary phase in all the cases except one in which there was a diminution. Neither eucortone nor oestrin had any definite effects on the polyuria, which is of interest in view of the known inhibitory action of oestrin on the gonadotrophic activity of the anterior lobe. A striking and persistent decrease in urinary excretion in the tertiary phase could be produced by hypophysectomy or pancreatectomy. It is apparent that the mechanism of experimental diabetes insipidus is very complex. The hypothalamus and posterior lobe of the pituitary must be regarded as a neuro-hormonal functional unit in respect of water metabolism, and the supra-optic tract would seem to constitute the motor secretory path for the control of the secretion of the antidiuretic factor. From the work of Ranson and his colleagues in America it may be concluded that the hypothalamic lesions lead to actual cessation of elaboration of the antidiuretic hormone. Though the tertiary phase of the experimental polyuria can be readily explained on these lines, the secondary and primary phases cannot. For the secondary phase it is possible to suppose that there is a liberation of the stores of antidiuretic hormone which are known to exist in the normal posterior lobe. Unfortunately for such a hypothesis removal of the posterior lobe and stalk has been followed by a latent period similar to that found after hypothalamic lesions, before establishment of the permanent polyuria. Still more difficult to understand is the primary phase, for this occurs at a time when there must be adequate amounts of antidiuretic hormone in the posterior lobe. This phase also is refractory to injections of pituitrin, which have been stated in some reports to increase the polyuria. Biggart and Alexander consider that this primary polyuria is unrelated to the effects of the permanent hypothalamic lesion of the tertiary phase, and that its mechanism is quite obscure. The primary phase is not due to effects from the anterior pituitary, because it occurs even after complete

[9] *Bull. Inst. med. Res.*, F.M.S., 1938, No. 4.
[10] *Ind. med. Gaz.*, 1938, **73**, 395.
[11] Ibid., 665.
[12] Ibid., 1939, **74**, 201.
[13] *Ann. trop. Med. Parasit.*, 1938, **32**, 103.
[14] *J. Path. Bact.*, 1939, **48**, 405.

hypophysectomy; further, there are no direct nerve connexions from the hypothalamus to the anterior pituitary. The possibility that hypothalamic lesions and hypophysectomy may have some transitory direct effect upon renal function is not considered in the paper by Biggart and Alexander. Such a possibility may deserve study.

LABELS FOR COSMETICS

They evidently take their cosmetics seriously in America. It has long been known that the trade in cosmetic preparations comes surprisingly high up the list of trades classified according to the magnitude of their annual turnover in the United States, and superficial inspection shows that its importance is growing with great rapidity in this country also. Vast sections of womankind, which a few years ago spent little or nothing on cosmetic preparations, now devote a considerable proportion of their weekly earnings to beauty culture, sometimes to the neglect, it is rumoured, of their meals. Here it is still practically unfettered by legislative regulation and manufacturers can make any claims they please for their products, and they take advantage of this licence by vaunting their ability in the therapeutic field. Common examples of this practice are lotions for the cure and prevention of blackheads, for the restoration of the growth and colour of the hair, for the eradication of wrinkles. Such claims are no longer permitted to the cosmetic manufacturer in the United States. It seems that a distinct line has now been drawn between the cosmetic care of the skin and its appendages and therapeutic measures. According to a leader in the *Journal of the American Medical Association* of September 2 legislation was passed in 1938 consisting of the Wheeler-Lea Act and a Food, Drug, and Cosmetic Act; these measures effectively regulate the trade in cosmetics. The Federal Trade Commission can now require a manufacturer to show cause for the claims he makes for his preparations. If such cause cannot be shown a "cease and desist" order can be issued to prevent such claims. For example, manufacturers are not allowed to use the word "non-allergic." This is because even the simplest preparation may be "allergenic," or, in plain language, irritating to susceptible persons. Manufacturers have also been notified that certain names and statements used on the labels of cosmetics are not permitted. Those who are accustomed to the go-as-you-please policy adopted in such matters in this country will be astonished at the strictness of the American regulations. It is forbidden to advertise depilatories for permanent removal of the hair, products represented as depilatories but which merely bleach the hair, hair growers or restorers, skin food, wrinkle eradicators, cosmetics represented as valuable because of their vitamin content, and many others which are the commonplaces of the advertising columns not only in the newspapers and fashion periodicals but also in Government publications such as the convenient stamp books issued by the Post Office, which are full of the advertisements of patent medicine vendors. One would have thought that official circles would have excluded advertisements of this nature from their publications, but such is not the case, and so far the British Medical Association has protested in vain. It is evident that in the U.S.A. either public opinion is in advance of this country in such matters or the authorities have determined to do more to protect the population against the wiles of the cosmetic manufacturer and their own credulity than our rulers are yet prepared to do in the British Isles.

OPHTHALMOLOGICAL MONOGRAPHS

Documenta Ophthalmologica[1] represents a welcome departure in ophthalmic literature. Ophthalmology is well served by its journals and has a rich textbook literature. It is otherwise with monographs on special aspects. Some periodicals like the *British Journal of Ophthalmology* and the *Acta Ophthalmologica* do indeed publish special supplements to overcome this defect, but the financial difficulties in bringing out monographs on subjects that have a limited interest are real. The first issue of the new venture is an ambitious effort to place monograph publications on the same basis as periodical literature with its wider appeal. It contains an excellent review on the process of light adaptation of the retina by Professor R. Granit of Helsingfors written in English. Dr. P. Baillart contributes an extensive discussion on the retinal circulation; Dr. A. Magitot supplies one on the symptomatology pathogenesis of glaucoma; Drs. Nordmann and Reiss deal with the chemico-physical aspect of cataract formation. These three contributions are in French. There are two articles written in German: one by Dr. F. P. Fischer of Utrecht, who deals with the water contents of the eye, and the other by Dr. P. Karrer of Zurich, who discusses the significance of carotinoids for the eye. The editor contributes an extensive discussion on the vitamins in ophthalmology in Italian. The scope of these articles is best indicated by the fact that their standard equals that of the best contributions to the well-known *Ergebnisse* published in German. The judicious mixture of clinical and academic material represented by these seven monographs is in itself a contribution to the postgraduate education of ophthalmologists. How thoroughly the subject-matter is reviewed may be gathered from the fact that the article on vitamins carries no fewer than 700 references to the literature. *Documenta Ophthalmologica* is promised in instalments of one each year, and we hope the war will not compel the publishers to break their word.

The George Alexander Gibson Lecture will be delivered before the Royal College of Physicians of Edinburgh by Dr. J. Crighton Bramwell, F.R.C.P., in the Hall of the College, 9, Queen Street, Edinburgh, on Tuesday, October 24, at 5 p.m. His subject is "Blood Pressure."

[1] *Documenta Ophthalmologica—Syntheses Scientifiques d'Ophthalmologie.* Edited by A. Juhasz-Schaeffer. Volume I. 250 fr. Paris: Masson et Cie. Zurich: The Documenta Press.

WAR WOUNDS AND AIR RAID CASUALTIES

The following article is a supplement to the series of lectures on war wounds and air raid casualties printed in these columns

DETONATION OF HIGH EXPLOSIVE IN SHELL AND BOMB, AND ITS EFFECTS

BY

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PART I

In the official *Medical History of the War*, in order to show how little novelty there is in warfare and to point out that mining dates back to remote antiquity, I quoted an ancient historian who described the use of asphyxiating gas in mining at the Siege of Ambracia in the year 189 B.C. On that occasion the Aetolians filled jars with feathers. These feathers were then set on fire and the resulting smoke blown by bellows into the faces of the Romans. 189 B.C.! Yet the method adopted by the Germans more than a thousand years later was somewhat similar.

In France, in 1917, a group of collieries in the Bethune district was one of the few remaining fields in active operation. Although one of the collieries, Fosse 8, in this very important mine system was in enemy hands, and all the shaft heads and the mining villages of Annequin, Vermelles, Philosophe, etc., had been frequently shelled, the French had been able to continue working. At the height of the submarine menace, when there was an urgent demand for coal by the French, the Germans made a determined effort to stop production in these collieries. Unfortunately the French had delayed building off Fosse 8, which was still used as a downcast shaft. Great quantities of chloropicrin gas were thrown down this shaft. Powerful fans, the modern development of the bellows used by the Aetolians, were installed in one of the collieries. These carried the gas to all quarters of the system, killing many French miners who were at work, and also members of a British tunnelling company who were on guard. The gas was so concentrated as to render respirators useless.

Gas warfare, as it is understood to-day, is the natural evolution of the use of explosives and dates back to the sixteenth century, when gunpowder revolutionized warfare. With its introduction the possibilities of offensive mining in all phases of fortress warfare greatly increased. In the sixteenth and seventeenth centuries gas poisoning from the fumes of exploded gunpowder was of frequent occurrence.

Is Gas Warfare Inhuman?

History shows that every new weapon has met with a hostile reception—inhuman, barbarous, unchivalrous, being common epithets to denounce their use. Among the vast majority of people in this country gas warfare is still regarded as the last word in barbarism. One reason, then, why the use of gas by the Germans raised such an outcry was that it was a new weapon against which there was no defence. It was, moreover, a weapon regarding which there was almost universal ignorance. Very few doctors in this country knew much about gas poisoning and the literature on the subject was very meagre. Everyone knows that by using it the Germans violated the agreement they signed at the Hague Congress in 1899. "The contracting Powers agree to abstain from the use of projectiles the object of which is the diffusion of asphyxiating or deleterious gases." I think it both instructive and interesting to recall a fact which is not nearly so well known: that the United States was one of the few Powers which did not sign that agreement. In my opinion, educated Americans have a better and more correct scientific knowledge and value of chemical warfare than the British. One of the reasons very properly brought forward by Admiral Mahan, the American delegate, was that the reproach of cruelty and perfidy addressed against the use of gas shells had also been uttered against fire-arms and torpedoes, although both were now employed without scruple. He insisted that

"it was illogical and not demonstrably humane to be tender about asphyxiating men with gas when all were prepared to admit that it was allowable to blow the bottom out of an ironclad at midnight, thus throwing four or five hundred men into the sea to be choked by water, with scarcely the remotest chance of escape."

Those who have had much experience of gas warfare know that of all modern weapons it is the most humane, or, perhaps I should say, the least inhuman, as it causes the least amount of suffering, the smallest percentage of deaths, and by far the greatest percentage of complete recoveries. Proof of this may be obtained from the official medical histories issued by the various combatants in the great war and from standard works on gas and chemical warfare.

In 1937 the Representative Body of the British Medical Association passed the following resolution:

"That this Meeting condemns unreservedly the use of poison gas in warfare as inhuman in its results and degrading to civilization, and relies upon the Council to do everything in its power with a view to securing the co-operation of the medical profession of all countries in order to prohibit the use of poison gas."

As no mention of high explosive shells or bombs was made, the use of these in modern warfare must be considered legitimate and humane. Those who were responsible must have been ignorant of the authoritative sources of information I have given. Perhaps they preferred the work of H. G. Wells. In his book *The Shape of Things to Come* there is the following description of gas warfare:

"The tortures of gas were already many and various, and most of the mixtures then used left tormenting weakness in the system for the rest of life." Further on he declares that "gas warfare ranks in horror with the story of judicial torture or the story of ritual cannibalism, but its inhumanity is more striking because of its nearness to our time."

In his *History of the Next Hundred Years* he describes, most incorrectly, the effects of mustard gas.

"It is doubtful if any of those affected by it were ever completely cured. Its maximum effect was rapid torture and death; its minimum, prolonged misery and an abbreviated life."

After I had finished reading the B.M.A. resolution I read in the daily newspaper that in Cleveland, U.S.A., forty constables dispersed with tear gas 600 strike pickets and their supporters! In France, as early as 1912, lacrimatory grenades had been used by the military in civil disturbances, and Prentiss, in his great work *Chemicals in War*, very pertinently points out:

"No Government can be open to criticism for using against an invading army weapons already employed against its own unruly nationals" (p. 688).

Legitimate Gas Warfare

Few people realize that, with what might be termed the legitimate weapons of modern warfare in which explosives are used, many casualties from gas poisoning occur. During the great war thousands of casualties from gas poisoning were caused by shells, trench mortars, bombs, and aerial torpedoes bursting in deep trenches, dug-outs, cellars, concrete structures, and enclosed places, as well as in ships. Casualties from gas poisoning also occurred from mobile charges used to destroy dug-out systems, from bombs bursting in houses and flooding basements with gas, from the bursting of gas mains and pipes, and from many other causes.

Carbon monoxide was the most dangerous gas encountered in military mining. After a mine was exploded the galleries were filled with gas. In some cases this welled up the shafts and flooded the surrounding trenches, poisoning the occupants. Gas poisoning occurred in gun pits, in closed machine-gun emplacements, owing to the blow back, in tanks from leakage of exhaust, and from the use of coke braziers in cellars, dug-outs, and other confined places. As the official *Medical History of the War* properly states, in all these cases

"the primary object for which the explosive was employed was its destructive effect, and it was to chance rather than to design that one must attribute the deadly effects of the fumes."

When the first Hague Conference was discussing the employment of projectiles, the sole use of which is the diffusion of asphyxiating or deleterious gases, it was pointed out that, when H.E. shells detonated, poisonous gases were generated which might cause death in confined areas. After discussion the Conference ruled that *if the splinter effect of a shell was greater than its noxious-gas effect, it would be regarded as a legitimate weapon, but if the gas effect were greater it should be banned.* That is to say, that allowance was made for the gases which are necessarily produced by high explosive shells. Gas was forbidden, but the most cruel and devastating of modern weapons, H.E. shells and bombs, received the sanction of the Conference. Prentiss very properly points out that the question of what projectiles were permissible within the meaning of the first Hague Conference was never actually put to the test, because, when gas warfare did begin on a big scale, it was not by projectile but by drift gas from cylinders.

Those who have extensive knowledge of the use of gas in warfare are greatly relieved that those in authority have recovered from their obsession regarding the importance of gas attacks from the air. They have now come into line with other countries which regard protection against H.E. bombs as of major, that against gas as of minor, importance. It is therefore much more important to study the use and effects of high explosives than those of gas poisoning, just as it is more important to provide splinter-proof shelters than gas-proof rooms.

High Explosives

In connexion with defence against aerial bombing certain important facts regarding explosives should be known to all doctors.

High explosives depend for their action upon the instability of the chemical equilibrium of their constituents. They consist of compounds of carbon, oxygen, nitrogen, and hydrogen so feebly combined that, when fired by combustion or detonation, new, simpler, and more stable compounds are formed. Once chemical action is started it proceeds with great velocity, and the explosive is immediately converted into gases with the evolution of heat. These gases, now occupying an enormously greater volume than the original substance, have powerful disintegrating properties. High explosives are very violent, detonating at the rate of several miles per second, many times greater than the most violent hurricane. In explosives used to propel bullets, shells, etc., the combustion is much slower. The violence and shattering effect of the explosive depend upon the velocity of detonation, which varies in different explosives, and also upon the amount of gas and heat generated. To effect detonation of high explosive a detonator is used, which in its action corresponds to a very violent and sharp blow accompanied by heat and flame.

Generally speaking, explosives contain an excess of oxygen, and, theoretically, should give rise to little carbon monoxide. But they vary much in this respect, and, in the conditions under which they are generally employed, produce considerable quantities of this gas. Shells give rise to less carbon monoxide than bombs or mobile charges. In all of these, if from any cause—deterioration of explosive, insufficient detonators, etc.—the wave of detonation dies out, and a slower form of combustion results, incomplete or partial detonation is said to have taken place. In this event the products of combustion are altered, much more carbon monoxide and, in addition, nitrous fumes being formed.

When a high explosive is ignited it burns at the rate of a few feet per second. During the war explosive salved from the enemy and from mines which could not be used was laid out in long lines and destroyed in this way. The products of combustion are quite different from those of explosion or detonation, very large quantities of carbon monoxide and nitrous fumes being formed. Such accidents occurred in the Navy during the war; and, in gold mining on the Rand, several accidents, where stores of explosive underground were accidentally set on fire, have been reported.

Notwithstanding the colossal scale on which explosives were used during the war, no epoch-making discoveries were made, and none have been made since. Nitroglycerine, which was discovered in 1846, still remains the most powerful high explosive. The large number of new explosives used during the war, and others which have appeared since, are merely new mixtures of substances which have been used for many years, some the natural outcome of shortage of certain materials. All the Powers at war, with the exception of Germany, used practically the same types of explosives. The Germans during the latter months of the war used liquid air very extensively as an explosive for demolition work, and for blasting operations in making dug-outs and tunnels. They were also the first to use liquid oxygen for supplying oxygen to airmen at high altitudes.

Very valuable information regarding explosives was gained from the extensive mining operations which were carried out on the Western Front. Never before had explosives been used on such a huge scale. The fact that in 1916 the enemy fired 700 mines and the British nearly 750 will convey some idea of the intensity of mine warfare. For a considerable period 30,000 men were engaged in active mining and in making underground protection for the troops.

It is the same in connexion with chemical warfare as with explosives, for to-day, twenty-four years after the start of this type of warfare, the two most effective gases belong to the phosgene and mustard gas groups. It is necessary to insist that the deadliest gases cannot be used in aerial warfare.

Most people have a very vague knowledge of explosives; this probably explains their easy belief in fantastic stories of the discovery of wonderful explosives of extraordinary power, tales of which are so often circulated by the Press. One recalls the report circulated soon after America entered the war, of a new American explosive, a tablespoonful of which would uproot St. Paul's. After the battle of Messines, when nineteen huge mines containing tons of high explosive were blown, it was amusing to read the statement of one famous correspondent that one pound of ammonal—the explosive used—could blow the

Mansion House to pieces. Tales of a similar kind have appeared at regular intervals in recent years, indeed they are a striking feature of the Secret Service and detective novels so widely read.

Liquid Oxygen and Liquid Air as High Explosives

A few months ago several newspapers harrowed the feelings of their readers by describing the devastating effects of a new bomb which had come into the possession of the Germans and which had been used in Spain. The high explosive in this bomb was liquid oxygen. It was half the weight of other bombs, and its explosive energy was said to be many times greater. What are the facts? This explosive has been in use for many years. It was first used on an extensive scale in the making of the Simplon Tunnel, where operations had been seriously affected and delayed by the dangerous contamination of the atmosphere from blasting by nitro-glycerine explosives. It was found safe to handle, powerful in action, and, except under most exceptional circumstances, did not produce poisonous fumes. Liquid air plant was installed and liquid air was used on a large scale to improve ventilation. After a short trial owing to practical difficulties its use was abandoned.

For a few years before the war the Germans had been using liquid air as an explosive in mining and quarrying. In the later years of the war Germany had available abundant supplies of liquid air from the manufacture of nitrogen, and great efforts were made to render it more practical and efficient. In 1917 and 1918 they used it for blasting in connexion with the construction of mine galleries, dug-outs, etc., and for carrying out demolitions. Towards the end of 1917 I took part in an investigation into its use as an explosive. Most valuable information was obtained from a South African mining engineer, who had a very large experience of blasting with this explosive. Engineers on the Rand have had many bitter experiences of the fouling of the atmosphere underground by high explosives. As the death rate from this among native labour was very high, strict precautions were taken, and in many mines compressed air and liquid air were in constant use to purify the air. The following were the principal reasons for abandoning its use as an explosive on the Rand. The same reasons prevented its adoption by the British during the war.

One great drawback to liquid air as an explosive, even when the cartridges were charged *in situ*, is its variability, the explosive power of the charge depending upon the proportion of oxygen in the cartridge, which necessarily varies from moment to moment. It is therefore less reliable, less efficient, and its results less easily controlled than other high explosives. Another important point is that, although weight for weight liquid air is more powerful than gelignite and other explosives—in other words its explosive energy is greater—with the type of cartridge used, bulk for bulk, it is less powerful. As a result the diameter of the drill-hole has to be twice that required for gelignite, etc. This was a serious drawback to its employment in mining. I understand that Woolwich Arsenal turned it down as useless for propellant work and for bombs.

Inflammable and Explosive Gases from Detonation of High Explosive in Bombing, etc.

The gases from the detonation of a high explosive vary in quantity and in composition according to the quality of the explosive used and also to other conditions. Those generally found are hydrogen, carbon monoxide, and methane (CH_4), all of which are combustible, and, when present in the proper proportion, explosive. Anything which prevents the carbon in the explosive being converted into CO_2 and the hydrogen H_2O will result in large quantities of H, CO, and CH_4 being formed. This will happen when there is imperfect detonation of part of the charge. Methane is never formed at the time of explosion, but results from the action of hydrogen on the oxides of carbon as the gas cools down. The greater the amount of hydrogen formed the greater will be the proportion of methane.

Explosives containing T.N.T. give rise to considerable quantities of hydrogen and methane. When any of the ammonium nitrate group of explosives are detonated in the open—for example, mobile charges, bombs, etc.—more CO, H, and CH_4 are found than when the explosive is detonated after being tamped. In some of the secondary explosions which I investigated during the war all these gases were present, but in others there was so little CO that canaries exposed to the atmosphere were unaffected.

The tendency of the gases to explode will depend on certain factors: (1) The amount of gas present—the larger the bomb the greater the volume of gas; (2) composition of gases; (3) velocity and density, pressure and concentration, of the gas. The greater these are the greater will be the liability to explode. Where gas is present in insufficient volume or in unexplosive percentage, and is ignited, the flame becomes spent.

The damage done to tunnels or dug-outs systems by the explosion of gases from detonation of high explosive is generally limited to a small area, and will depend upon the force of the explosion, much greater where the tunnels and galleries are narrow, much smaller when they are large. Even when explosives are used on a comparatively small scale in blasting enough gas may be given off to cause an explosion. The following is an example:

In making a deep dug-out in very hard chalk, cheddite was used for blasting. Of the four shots fired two failed to detonate, one detonated imperfectly, and one completely. After twenty minutes had elapsed the men returned to the face to examine the effects and an explosion occurred. Inquiry subsequently showed that in this case the explosive used had been stored for a long time, with consequent deterioration.

During the war attention was first directed to the explosibility of gases formed from the detonation of high explosives. In 1916 a tunnelling company suffered considerable casualties, the officer commanding, another officer, and sixteen other ranks being killed. As this conveys a very good lesson of one of the great dangers of military mining, and *an entirely unknown danger of bombing*, I shall give a short description of what occurred. *Until this disaster was investigated the danger of carrying a naked light into galleries in which gas was known to be present was not appreciated.*

The enemy exploded a camouflet—that is, a mine which did not break the surface or crater. The explosion was not intense and damage done to one gallery was small. It is probable that the mine had been charged for some time and the explosive had deteriorated. At the time four officers and a considerable number of men were in the galleries. There was an order that as soon as an explosion occurred everyone must leave the mine; an attempt was made to carry this out, but before this could be effected a secondary explosion occurred. The two officers near the site of the explosion were killed by the force of the explosion, both showing extensive burns; the sixteen men, who were at a considerable distance from the point of explosion, were killed by carbon monoxide. The mine rescue men were able to save a large number of the men. As a result of this an order was issued that no naked lights were to be used in the galleries till these were proved clear of gas. Electric lights were always to be employed when gas was known to be present.

Bombs and aerial torpedoes on detonation give rise to large quantities of gas, the CO content of which will be greatly increased if part of the charge is imperfectly detonated. Hence when they incompletely detonate in

houses, the occupants of the cellars and basements are not only exposed to the dangers of gas poisoning against which the gas mask offers no protection, but they run the risk of gas explosions and fires. During the war in air raids on cities and towns and villages serious gas explosions and fires occurred and many lost their lives.

The gas thus produced may be ignited by the great heat resulting from the detonation of the bomb, or by incendiary bombs, or by the presence of a naked light. As bombs penetrate deeply before detonating gas may be given off from the ground slowly, and very gradually collect in cellars and basements, to be fired by someone approaching with a naked light; sometimes it may be hours after the bombardment has ceased. In other cases gas has found its way into cellars at a distance from the exploding bomb by passing through fissures that have been caused by the explosion. Serious gas explosions and fires were also caused by the ignition of illuminant gas that had escaped from pipes smashed by the explosion. These explosions may occur during salvage work among the debris, when pockets of gas may be fired.

It is an obvious precaution to make use of electric torches during all operations where gas is suspected, and, after an air raid, never to enter a cellar with a naked light.

THE STRETCHER PROBLEM

BY

L. CROME, B.Com., L.R.C.P. & S.Ed.

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No single item in the equipment of the medical services in time of war is more important than the stretcher. In the Spanish War, as a result of extensive experience, one type was universally adopted for use in the armed services and in the civilian casualty organizations. This stretcher was employed in the field for the primary transport of casualties from the line of fire to the dressing stations. The same stretcher was carried in all ambulances, and was used in the waiting rooms of field and base hospitals and in all medical units connected with A.R.P.

At present there are two main types of stretcher in existence in England. One is the standard R.A.M.C. stretcher and the other is the type recommended by the Ministry of Health for A.R.P. purposes. The fact that the Ministry of Health has recommended a stretcher entirely different from that used by the R.A.M.C. points to the conclusion that the latter was not considered satisfactory; while the fact that the R.A.M.C. has not adopted, and is unlikely to adopt, the stretcher recommended by the Ministry of Health must imply that neither of the two types is entirely adequate. Before describing the stretcher used in Spain it is necessary to point out that stretchers serve three main and two subsidiary purposes. They are used (1) to carry wounded from the field to the ambulance base; (2) in motor vehicles and trains for the transport of wounded to and from hospitals; and (3) in the waiting rooms of dressing stations and hospitals for the interim accommodation and treatment of patients before operation or hospitalization. The secondary uses of stretchers are (*a*) as sleeping accommodation for medical personnel; and (*b*) for the erection of huts, shelters, covers, and camouflage in circumstances where no other building material is at hand.

General Specification

Stretchers must have definite qualities, which will now be stated in their approximate order of importance.

1. Stretchers must be as light as is compatible with serviceability.

2. Stretchers must be comfortable. At times patients will have to lie on them for twenty-four hours or more.

3. Stretchers must be robust; they will have to stand up to the hardest wear.

4. After gas attacks stretchers may have to be decontaminated. It is essential to use material which will stand decontamination.

5. Although not much can be done in the way of postural treatment during transport, it is helpful to have a stretcher capable of holding some part of the patient's body in a position of elevation. This is especially important in cases of cranial or thoracic injury.

6. Stretchers must have sufficient clearance to prevent the patient from touching the ground. If a patient is at a sufficient distance from the ground, treatment, such as injections, bandaging, blood transfusion, is considerably easier.

7. Stretchers must be used in motor vehicles, not all of which have been constructed as ambulances. The minimum of structural alteration of the vehicle itself should be necessary before it is adapted to carry stretchers.

8. Stretchers must have suitable attachments for the application of essential splints, such as the Thomas splint.

9. While not in use for the transport of casualties the stretchers will have to be carried by stretcher-bearers from one place to another. It is necessary to make this work as easy as possible. At times only one man will be available to carry such a stretcher.

Need for Standardization

Two essential considerations in the transport of casualties are the prevention of shock and the prevention of further local injury at the site of the lesion. All extra handling of the patient, such as is necessary for the changing of stretchers, increases the danger of shock and of further injury. The ideal to aim at is, therefore, complete and uninterrupted transport of the casualty on one stretcher. At each break in the evacuation journey the loaded stretcher should be exchanged for an empty one, the latter being returned to the previous point by the returning stretcher-bearers or ambulance. Thus the patient will be spared the pain, discomfort, and danger of being moved from one stretcher to another, and much time will be saved in the process of evacuation. Ambulances will be able to return immediately after depositing their casualties and receiving in exchange an equal number of empty stretchers with the corresponding number of blankets. Such a system of relay evacuation is only possible if the same type of stretcher is used throughout the evacuation line. The needs of the armed services and of the civilian population are identical in respect of stretchers, and there is no reason why the same type of stretcher should not be used throughout the country.

If a "universal" type of stretcher is necessary from the functional point of view its standardization is essential from the point of view of production, maintenance, and replacement. The stretcher requirements of the armed forces may be calculated from the presumed ratio of one stretcher to thirty men. For the civilian population the ratio is more variable, but an anticipated figure of 500,000 stretchers at the beginning of the war, going up to 750,000 during the first year, is not an exaggeration. The problem of production on this scale and continuous replacement can only be satisfactorily solved by complete standardization and the timely preparation of raw materials necessary in the construction of these stretchers. It is also desirable that if one of the component parts of a stretcher is irreparably damaged or lost it should be capable of being replaced by another identical part without the necessity for discarding the entire stretcher.

Storage space must also be considered. Stretchers must be produced in peace time and stored, and they must be delivered in such a way that the minimum space is

required for their transport and storage. Finally, cost can only be brought down to a minimum if the stretchers are standardized on a mass production basis.

The Spanish Stretcher

The Spanish stretcher consists of five parts which can be readily assembled: (1) two horizontal wooden poles; (2) iron head-piece; (3) iron foot-piece; (4) a double layer of canvas fastened with leather straps in front of the head-piece; and (5) two shoulder-slings made of stout leather with loops for the handles of the stretcher. When assembled, the stretcher is carried by two bearers, each wearing a shoulder-sling in such a way that the weight of the stretcher is secured by these slings even if the hand grip should fail (Fig. 1). Dismantled head- and foot-pieces can be rolled into the canvas and carried on the shoulders of one of the stretcher-bearers, being secured by the shoulder-slings. If necessary, the same stretcher-bearer can also carry the poles (Fig. 2), but it is usual for the poles to be left to the second stretcher-bearer.

Fig 1.—The Spanish stretcher in use.

Fig. 2.—The Spanish stretcher dismantled.

The fittings necessary for the reception of the stretcher in a motor vehicle can also be used for stretchers which are not of the type described (Fig. 3). These fittings are inexpensive and easy to manufacture, and can be fitted in any closed van without structural alteration. Each fitting has two swivels which enable it to be swung flat against the side of the ambulance, leaving space free for sitting patients if this is required. Though it serves as a spring, the fitting is extremely strong. During the whole of the Spanish War it was unknown for any of them to

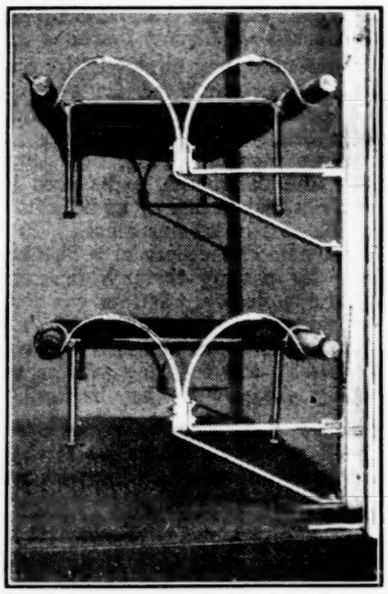

Fig. 3.—The fittings used to convert an ordinary light van for use as an ambulance.

give way. Moreover, it has a very small surface and is therefore seldom damaged by fragments of bombs or shells.

Conclusion

It is suggested that the type of stretcher described can be put to all uses in war time. It meets all the requirements for such stretchers and is easily standardized.

By reversing the position of the patient on the stretcher the upper horizontal bar of the head-piece may be used for attachment of a Thomas's splint. The empty triangular space formed by the upper and lower layers of the canvas at the attachment to the head-piece may be used for carrying the patients' loose belongings.

All the component parts of the stretcher, including the canvas, are detachable and can easily be cleaned, washed, disinfected, and decontaminated.

The incline formed by the upper layer of the canvas allows for postural treatment. The complete stretcher weighs 25 lb.

While I have not attempted to balance the advantages and disadvantages of the suggested stretcher against those used by the R.A.M.C. or recommended by the Ministry of Health, its relative merits will be readily appreciated by all who are familiar with the problem.

I wish to express my gratitude to Messrs. N. A. Bronsten and Co. Ltd. for their good offices in preparing the demonstration model of the stretcher described above and allowing me to reproduce the photographs.

Photodynamic Activity in Carcinogenic Hydrocarbons.—Exposure to extreme dilutions of either of four carcinogenic hydrocarbons sensitizes cultures of Paramoecium to ultra-violet light. Other substances having this photodynamic action (eosin, acriflavine, etc.) are less potent and unaffected by light conditions during contact, whereas carcinogenic hydrocarbons sensitize much more effectively in the dark. These observations, apart from their wider theoretical interest, disclose a method for the biological assay of small quantities of carcinogenic hydrocarbons.—Comparison of Photodynamic Activity of Some Carcinogenic with Non-Carcinogenic Compounds. I. Doniach.—*Brit. J. exp. Path.* June 1939, 20, 227.

INCOME TAX

Diminution in Earned Income

In his Budget speech the Chancellor of the Exchequer made it clear that he recognized that while all income-taxpayers would have to make sacrifices to meet the increased demands under the new Finance Act, the higher rates of duty would bear with particular severity on those whose incomes were falling, and especially where the income was "earned." That is, of course, the inevitable consequence of the system of assessing income for one year on the basis of the profits of the previous year. To pay at an increased rate of tax on, say, £1,000 is bad enough if the income is stable, but it is harder still to find the tax if in the meantime the income has fallen to, say, £750. Accordingly, Section XI of the Finance (No. 2) Act, 1939, provides some measure of relief to taxpayers whose incomes come within a carefully defined class. The national circumstances of the present year will affect individual incomes to a very great extent, and medical practitioners will be by no means exempt from the general fluctuations. For that reason it may be convenient to put on record at the earliest opportunity the main features of this form of relief. In the first place the relief applies to "individuals," and not, for instance, to a partnership as such; in the second place the fall in income must be "owing to circumstances directly or indirectly connected with the war"; and, thirdly, the relief applies only to "earned income." In order to invoke the benefit of the section a claim for 1939–40 must be made by April 5, 1941, and the claimant must be able to show that his actual earned income for 1939–40 is not more than four-fifths of the amount at which it is assessed. If, therefore, the earned income has fallen from £1,000 in 1938–9 to £750 in 1939–40, the assessment on £1,000 for 1939–40 (on the basis of the previous year's earnings) can be reduced to the actual earnings of that year—that is, to £750.

There is one corollary to the relief which should not be overlooked. If the taxpayer elects to have the 1939–40 assessment adjusted in that manner then the Revenue authorities can require an adjustment of 1938–9 to the actual earnings of that year—the reason being that otherwise a "bumper" profit of 1938–9 might escape the Revenue net. There will, of course, be a number of cases where the fall is heavy but less than one-fifth; and it would obviously be unfair if a reduction of 20 per cent. gave full relief and a reduction of, say, 19 per cent. obtained no relief at all. To meet that point some elasticity has been given to the limit by providing that, in effect, a taxpayer can, so to speak, forfeit to the Revenue the excess over four-fifths and then obtain the relief he would receive if his earned income had in fact been reduced to four-fifths of his assessed income.

One further point should be mentioned. While the section is not explicit on the point it appears to be drawn in such a way as to require aggregation of the earned income for the calculation of the ratio of diminution. For instance, suppose a single-handed practitioner whose earnings in 1938–9 (and therefore his assessment for 1939–40) were £1,000 joins the Forces, with the result that for 1939–40 his practice earnings fall, partly perhaps owing to the employment of a locumtenent, to, say, £700, but on the other hand he receives assessable military pay to the extent of £300, then his assessed earned income is (£1,000 +£300=) £1,300, and his actual income is (£700+£300=) £1,000, and as £1,000 is less than four-fifths of £1,300 he is entitled to have the assessment on his practice reduced from £1,000 to £700. Further, if the practice earnings were £750 instead of £700, so that the actual earned income became £1,050 as compared with four-fifths of the assessed earned income—that is, with four-fifths of £1,300 =£1,040—then he could have the "actual" basis applied, but would have the relief restricted by the £10 he would be required to forego to bring himself within the limit of four-fifths.

It will be realized that the provision is one of considerable complexity, but it will be of real benefit in many cases, and is therefore one which should be borne in mind whenever the application of the previous year's basis to the assessment of earnings inflicts substantial hardship.

A STUDENTS' REGISTER

An accurate but incomplete register of medical and dental students who have been admitted to the schools during the last academical year has lately been issued by the authority of the General Medical Council under the new provisions for students' registration, which came into force in September, 1938. The volume consists of an alphabetical list of the students admitted during the year, with the date of birth, the date and kind of preliminary and additional examinations, the school at which medical studies have commenced, and the date of registration. The number of medical students whose names have been returned to the Council by the authorities of the schools is 1,735, but another 400 or 500 must be added because, for some unexplained reason, returns are not forthcoming for several schools, including Liverpool, Aberdeen, St Andrews, Queen's University, Belfast, and University College, Dublin.

The various preliminary examinations in general education by virtue of which the students have been admitted to the schools of medicine and of dentistry number nearly seventy. Most of them are held by universities, a few by public authorities, such as the Scottish Education Department and the Central Welsh Board, or by chartered bodies such as the College of Preceptors. The examination which has brought the largest number of medical students on to the register is the London Matriculation (188), followed closely by that of the Scottish Universities Entrance Board (178), the School (or Leaving) Certificate Examination of the Oxford and Cambridge Schools' Examination Board (173), the Cambridge "Previous" Examination (153), and the London General Schools (140). Of the twenty-four additional examinations taken the highest number of medical students (507) came through the University of London; the next highest through the University of Edinburgh (202). Examinations held abroad gave thirty-eight medical students and the same number of dental students to the register, but whereas most of these medical students entered by way of universities in the British Empire, most of the dental students were Continental exiles who had taken their degree in medicine many years ago, chiefly in Vienna.

Of the medical schools to which the students have been admitted, those of the University of London have taken 506, King's College and University College each taking over 100; the University of Cambridge has taken 159, that of Oxford 89, that of Durham 76, while Leeds and the Victoria University, Manchester, have each taken 67. The students who have started at Edinburgh number 202; Glasgow can show only half that total. The number of women who have entered the study of medicine during the past year is 284, or just over 16 per cent. of the total entry. Medicine attracts a larger proportion of women than does dentistry, for of the 316 dental students only 32 are women, or 10 per cent. The oldest student to enter medicine is a woman; she was born in 1893, passed the London Matriculation examination in 1922, and is now beginning medical study at the London School of Medicine for Women. She has half a dozen men colleagues, however, who are taking up medicine when over the age of forty. The year of birth of the great majority of students, medical and dental, is 1919 or 1920. A few—140 medical students—were born in 1921.

No one could have foreseen at the time this register was compiled that the students whose names it contains would now be so widely dispersed, receiving their training in places and under conditions so unexpected, yet their unusual experience may be of value. Glancing over these arid lists of names one cannot help wondering whether here and there one of them may be on the tongues of all men forty or fifty years hence.

Nova et Vetera

AN EARLY EXPERIMENTAL LOBECTOMY

Mr. R. T. Gunther, keeper of the Old Ashmolean Museum at Oxford, has recently published the twelfth volume of *Early Science in Oxford*. It deals with Dr. Robert Plot and the correspondence of the Philosophical Society of Oxford with the Royal Society in London and the Philosophical Society in Dublin. The letters which passed between the Oxford and the Dublin Societies are of especial interest. Here is one from Dublin dated November 10, 1684.

"Dr. Mullen gave an account of the following experiment: A vintner in this town being troubled with a consumption, complained much of a trouble in the left side of his thorax, and would often with some confidence and persuasion assert that he was sure he should do well enough could the thorax be opened and a certain piece of his lungs be cut out with impunity. But this desperate remedy was not hearkened to by anyone: so the sick man died. Notwithstanding, Dr. Mullen resolved to try the experiment on a dog, and opening its thorax he cut off from one lobe of the lungs a piece three inches long and two broad, and making a ligature to hinder the effusion of blood he closed the wound. The dog recovered perfectly well and showed no manner of want of what he had lost. About six months afterwards the doctor hanged the dog, and opening it found the end of the lobe, where the wound was made, firmly united to the intercostal muscles where the thorax was opened, and the thread that made the ligature had vanished and was supposed to have been discharged through the wound in the chest."

Dr. Allen Mullen, who records the experiment, was a brilliant young anatomist of North Irish extraction who is said to have come to a bad end. He graduated from the Dublin University, taking his Arts degree in 1676 and his M.D. in 1684. He was elected F.R.S. on July 18, 1683, and became a member of the newly formed Dublin Philosophical Society in the following year. He left Dublin for London on account of some trouble with a lady, went to Barbados, drank too much, and died there in 1690.

D'A. P.

AMERICAN ASSOCIATION OF THE HISTORY OF MEDICINE

The American Association of the History of Medicine, which, alas! possesses no congener on this side of the Atlantic, held its fifteenth annual meeting at Atlantic City, New Jersey. With a view to increasing its usefulness and to stimulating research, study, and interest in medical history in North America, the Association last year adopted a new constitution and by-laws and chose as its official organ the *Bulletin of the Institute of the History of Medicine of the Johns Hopkins University*, now known as the *Bulletin of the History of Medicine*. The meeting was well arranged, due space being given to both new historical material and to a critical evaluation of existing knowledge, and the papers, which were published in the July number of the *Bulletin*, were appetizingly short. Among the material presented was "The Old Age of King Lear" by Professor John W. Draper, "Nursing Cans" by Dr. Howard Dittrick, "Clinical Teaching in America with Some Remarks on Early Medical Schools" by Professor David Riesman, "Idealogical Basis of Discoveries" by Dr. Iago Galdston of the New York Academy of Medicine, and "Provision for the Sick Poor in Colonial Times" by Mr. Albert Deutsch. In an account, full of colour and scholarship, of "Occupational Diseases of English Seamen during the Seventeenth and Eighteenth Centuries," Dr. George Rosen of Brooklyn dealt with such maladies as scurvy, typhus, typhoid, dysentery, relapsing fever, and yellow fever. One of the most challenging papers, the presentation of which was a continuous delight, was "The Place of the Amateur in the Writing of Medical History" by Mr. W. B. McDaniel, Librarian of the College of Physicians of Philadelphia. At the Council meeting the delegates of the constituent societies read their reports, Dr. Victor Robinson representing the recently launched New York Society for Medical History, and at the business meeting Dr. Esmond R. Long was elected President, Dr. Edward B. Krumbhaar, who had founded and steered the Association through its infant years, Honorary President, and Drs. Harvey Cushing, Arnold C. Klebs, Rudolph Matas, and Charles W. Burr Honorary Members. After the dinner the retiring President, Dr. Walter R. Steiner, gave an address entitled "Some of Louis's Distinguished American Pupils," and Dr. William G. Leaman of Philadelphia, through a fascinating film, showed how medical history may be introduced into clinical teaching. The Association's secretary, Professor Henry E. Sigerist, is to be congratulated on the success of this meeting, which was very largely due to his foresight, imagination, and tireless energy.

HISTORY OF MEDICAL SOCIETIES

The work on *British Medical Societies*, edited by Sir D'Arcy Power, who has written the preface and the account of the Abernethian Society, consists of thirty-four articles by various writers which originally appeared in the *Medical Press and Circular* and have been now republished with or without additions.[1] Of the thirty-four societies, one (Society of Apothecaries) was founded in the seventeenth century, seven in the eighteenth, seventeen in the nineteenth, and nine in the twentieth. But for the amalgamation in 1907 of seventeen societies in the Royal Society of Medicine, whose history is related by a former president, Dr. T. Watts Eden, the list might have been considerably longer. The topographical distribution of the societies is as follows: London, 21; provinces, 6; Wales, 1; Scotland, 4; and Ireland, 2.

Among the earliest medical societies were those founded by medical schools, such as the Royal Medical Society of Edinburgh (1737), Guy's Hospital Physical Society (1771), and the Abernethian Society of St. Bartholomew's Hospital (1795). The Listerian Society of King's College Hospital received its present name in 1912, having previously been known as the Hospital Medical Society since its foundation in 1833.

The majority of the societies deal with medicine in the widest sense of the term, and the only specialist societies described are the Ophthalmological Society of the United Kingdom, founded in 1880, the Anatomical Society of Great Britain and Ireland (1887), the Medico-Legal Society (1901), the Medical Section of the British Psychological Society (1901), the Pathological Society of Great Britain and Ireland (1906), the Royal Society of Tropical Medicine and Hygiene (1907), the Research Defence Society (1908), and the Association of Surgeons of Great Britain and Ireland (1920).

Many papers which have since become classical were first read before these societies, such as John Hunter's paper on ligature of the femoral artery and Jenner's on vaccination before the Guy's Physical Society in 1802; Paget's paper on *Trichina spiralis* before the Abernethian Society when he was a student in 1835; and Sir William MacEwen's paper on cerebral abscess before the Royal Medico-Chirurgical Society of Glasgow in 1887. Mention must, of course, be made of the publications of the largest medical society in the British Empire, whose history is written by Sir Henry Brackenbury—namely, the British Medical Association—which has issued the results of various collective investigations of urgent medical interest.

The book contains numerous illustrations, including portraits, meeting-places of the societies, and presidential badges.

[1] *British Medical Societies*. Edited by Sir D'Arcy Power, K.B.E., F.R.C.S. (Pp. 312; 48 plates. 10s. 6d.) London: Baillière, Tindall and Cox. 1939.

Local News

ENGLAND AND WALES

London County Medical Officer of Health: Retirement and New Appointment

At its meeting on October 17 the retirement of Sir Frederick Menzies, medical officer of health, was reported to the London County Council, and the Council adopted a resolution placing on record its high appreciation of the services Sir Frederick Menzies has rendered. The Emergency Committee stated that his retirement would deprive the Council of the services of an officer in whom it had justifiably placed the highest confidence. "The strength and graciousness of his character and personality have won the respect and esteem of members of the Council and of the members of his staff, both at the central office and at the hospitals." On the question of superannuation, it was stated that Sir Frederick Menzies became a full-time officer of the Council at the age of 35 years. A regulation of the Council provides that in considering the grant of special retiring allowances to officers who enter the service of the Council at the age of 30 or upwards due weight shall be given to the fact of such entry, coupled with the possession of special qualifications not usually to be obtained within the service. The Council decided to add five years to his pensionable service, the effect being that while the lump sum (£3,000) payable to him from the superannuation and provident fund remains the same, his pension of £1,056 a year from that fund will be supplemented by a separate amount, payable out of the county fund, to bring the total to £1,306 a year.

The present deputy medical officer of health, Dr. W. Allen Daley, was appointed to succeed Sir Frederick Menzies as from November 2, the date of his retirement, his salary to be £2,750, rising after one year to £3,000 a year. Dr. Daley, who is 52 years of age, had a wide experience in the provinces, culminating in his appointment as medical officer of health and school medical officer of the city of Hull. In 1929 he became a principal medical officer in the public health department of the L.C.C., and was placed in charge of the general public health division. Subsequently the scope of his responsibilities was widened to include the oversight of staffing and other matters connected with the hospitals service. He acted as medical officer of health for a period of six months in 1932 during the absence on sick leave of Sir Frederick Menzies. He was appointed deputy medical officer of health and deputy school medical officer in November, 1938, and has had wide responsibilities as second officer of the department. Dr. Daley is also a representative of the Minister of Health on the Central Midwives Board, vice-chairman of the Central Council for Health Education, and examiner in public health to the University of London.

Cancer Research in Yorkshire

The reports and accounts of the Yorkshire Council of the British Empire Cancer Campaign, 1938–9, include the report of the department of experimental pathology and cancer research, University of Leeds, and of research work on cancer at the Field Laboratory, University of Sheffield. An investigation is in progress on the mechanism of carcinogenesis by the dye *p*-dimethylaminoazobenzene, alternatively known as dimethyl-yellow or as butter yellow, a substance which, as was shown a few years ago by Kinosita and other Japanese workers, induces malignant disease of the liver, hepatomata, and chalangiomata when given orally or by injection to rats and mice. In the present study rats are killed at intervals during a course of feeding, and it appears that the formation of liver cancer is preceded by cirrhosis. This experimental cirrhosis bears a number of points of resemblance to the ordinary multilobular cirrhosis of human beings, considered by many observers to be a precancerous condition, but it also shows a notable difference—the absence of ascites. It is suggested, however, that since the tumours appear to arise at a comparatively early stage in the experimental process the absence of ascites may be attributable to the death of the animal before there is time for the condition to appear. A point of interest is that tumours can arise at a period when the cirrhosis is not as yet irreversible, for in animals killed some time after the administration of the dye has been discontinued the tumour-free portions of the liver may have returned to a more or less normal condition. Further experiments deal with the action of large single doses of dimethyl-yellow upon the livers of animals; also with the rate of absorption, which has been found to be very rapid. The rate of excretion of the dye is still under investigation.

AUSTRALIA

Queensland University Medical School

On August 11 the Hon. W. Forgan Smith, LL.D., Premier of Queensland, officially opened the Medical School of the University of Queensland at Brisbane. This is the final achievement in the campaign for the provision of facilities for medical education in the State. When in October, 1936, the Faculty of Medicine within the University of Queensland was inaugurated that function marked the successful issue of representations which began as long ago as the foundation of the University itself. The first proposals in 1913 were interrupted by the outbreak of war. In 1922 arrangements were made for anatomical demonstrations to be given to some of the dental students, who received two years' training at the dental school in George Street. In 1925, largely as the result of the work of a subcommittee of the Queensland Branch of the British Medical Association, a conference of delegates was called by the Home Secretary to discuss the subject. Two years later, with the co-operation of the Brisbane and South Coast Hospitals Board, a small school of anatomy for the teaching of dental students was established. In 1934 the activities of the anatomy school were transferred to a building given to the University for the purpose by the Freemasons of Queensland. In the following year a Faculty of Dentistry was established within the university and the Premier of Queensland appointed a select committee to report upon the practicability or otherwise of establishing a Faculty of Medicine and a Faculty of Veterinary Science within the University. The committee strongly advocated the institution of these faculties, and stated that the Faculty of Medicine should include particularly tropical medicine and public health as parts of routine medical education, and should be based upon recognition of the essential nature of the practical and clinical side of medicine. Meanwhile the College of Pharmacy was made available to the University for the purpose of physiology. With the establishment of schools of anatomy and physiology it became possible to provide medical courses for students of the second and of the third year. The next step was to provide further accommodation to include the departments of pathology, social and tropical medicine, and other clinical departments. The Government undertook the cost and decided to provide worthy buildings.

The new Medical School of the Queensland University occupies a commanding position at Herston on a site of over six acres adjoining the western boundary of the Children's Hospital and within a few minutes' walk of the Brisbane General Hospital. The building, in the Renaissance style, is three stories in height, and surmounted by a copper dome rising from a flat roof. If future extensions are required these can be added in the form of projecting wings at either end of the central block, which measures 222 feet in length. It is intended that fourth, fifth, and sixth year students shall receive in the Medical School the whole of their training in all branches of medical and surgical science and that the third year students shall receive their training in anatomy there, while first and second and the remainder of the third year work will be carried out at the present University, and later on at the new building in course of erection at St. Lucia.

Reports of Societies

THE PROFESSION OF SURGERY

Mr. Zachary Cope's Address

The annual address from the chair of the Medical Society of London was delivered on October 9 by Mr. V. Zachary Cope, the incoming president, whose subject was "The Profession of Surgery."

Mr. Cope began with the remark that during his own lifetime of fifty-eight years surgery had developed from an unscientific to a scientific profession which had strongly established itself among all civilized peoples and brought benefit to nearly all persons at some time in their lives. The advance of the surgical craft had been so rapid and its conquests so firmly consolidated that it was scarcely realized that the profession was a new one—new in outlook and achievement and new in its economic and social importance. The modern profession of surgery bore little or no resemblance to the surgery of sixty years ago. The young surgeon of to-day performed as a routine operations undreamed of at that not very distant time, and from the economic point of view surgery had brought to the community health, happiness, and working power of a value beyond estimation.

In the modern sense surgery was impossible until the prevention of infection of wounds was demonstrated. Lister's first important publication on the use of antiseptics was made in 1867, while Lawson Tait's empirical but successful aseptic methods began just a little later. It was well known that the London surgeons were among the last to accept Lister's teaching, but it deserved to be recalled that it was at a meeting of the Medical Society of London that Lister obtained one of his first acknowledgments in the metropolis. That meeting was held on October 29, 1883, when he addressed the society on the operation for fracture of the patella. At the end of his address he was given a good reception, and in reply he was reported to have said: "Gentlemen, thank you most heartily for that cheer, for there was a time when such remarks proceeding from my friends met with a different reception." Sir George Turner in his reminiscences stated that Lister said of that cheer that it was the first he had had since he came to London five years before.

Great Periods of Surgery

The period between 1867 and 1881 was described by Mr. Cope as the gestation period of modern surgery; from 1881 to 1900 as the time of youth; from 1900 to 1918 as adolescence; and from 1918 until the present day as maturity. During the earliest of these periods the teaching of Lister was rapidly spreading through Germany, America, and finally England. Even before 1867 ovarian cysts had been successfully removed on several occasions, and colostomies had been performed by some surgeons, but before 1881 no appendix had been removed, no perforated ulcer had been successfully sutured, the surgery of the thyroid was unknown, the surgery of the spinal cord and brain, apart from depressed fracture, had not begun, and renal surgery had hardly been touched.

The period from 1881 to the end of the century saw great advances in all directions. The surgeons explored every type of disease which they thought might be relieved by the new surgery. The necessary process of trial and error was not always followed by successful results, but by 1900 the lines of modern surgery had been laid down, though not standardized. From then until the beginning of the great war the new surgery showed some of the symptoms of adolescence—for example, in the extremes of some operations then performed—but during this period there was an increasing standardization of well-recognized operations, and new fields were being opened up, though there was evident neglect of certain important sections of surgery which were apparently overshadowed by the development of surgery of the abdomen. This was particularly the case with the treatment of simple fractures, wounds, and orthopaedics generally. During the last war grim necessity forced surgeons to focus their attention on the treatment of wounds, fractures, and deformities, and one outcome was the rapid development of plastic and orthopaedic surgery.

To-day there was no part of the body which was immune from the attack of the surgeon, and no organ or viscus which had not at some time or other benefited from surgical intervention. The scope of surgery had widened to such an extent that it was an important factor in maintaining the health of the nation. In the year 1932—the last year for which he could get good statistics—over 150,000 operations were performed in the hospitals of London alone. At a conservative estimate this meant that half a million operations were performed annually in the country as a whole, and that more than one per cent. of the population underwent an operation in a year.

Supply of Surgeons

The necessary corollary followed that it was in the highest interests of the nation that there should be an adequate supply of thoroughly trained and experienced surgeons. Could it be said that such a supply was available? An affirmative answer could not be given with certainty. There was no doubt that surgeons at hospitals were worked harder than in past times if the number of operations were taken as a criterion At St. Mary's, his own hospital, sixty years ago there were ten operating surgeons, to-day there were fifteen, yet during those sixty years the number of operations had multiplied many times. In 1877 the number was 154, and in 1882, 613; by 1906 it had reached 1,632, and in 1938 this figure was more than doubled. These statistics showed the increased work which had been thrown upon the individual surgeon, but they did not necessarily prove a dearth of surgeons. Those in large cities might sometimes think that the profession was overcrowded, but it must be remembered that it was to large cities that talented and ambitious men naturally gravitated. A better opinion could perhaps be gathered by considering the number of surgeons who obtained the higher surgical qualifications. In England and Wales in 1880 there were 1,215 holders of the F.R.C.S.; in 1938 the Calendar of the Royal College gave 2,480, almost exactly double, this in a period during which surgical activity, as judged by operations only, had increased tenfold. Admittedly there were other high surgical qualifications besides this diploma, but there was no reason to suppose that the number of their possessors had increased to a greater extent than the roll of the Royal College. It must be concluded either that the country was over-supplied with surgeons in 1880 or that it was under-supplied at the present time. That the latter was more likely was suggested by the fact that many surgeons were attached to two, three, or four hospitals of considerable size.

Training of the Surgeon

Although modern surgery required a high degree of special training there was in this country no compulsion on the surgeon to undergo any special postgraduate course and no necessity for him to obtain any special diploma in surgery before starting to practise this difficult art. The only guarantees that intervened between the incompetent surgeon and the public were: (1) the discriminating judgment of hospital committees; (2) the discriminating judgment of his professional colleagues; and (3) the sense of responsibility of the surgeon himself. It was a testimony to the good sense of the profession that these guarantees seldom failed.

Mr. Cope proceeded to discuss the kind of training which the surgeon ordinarily received. Usually he began by holding the office of surgical registrar, though sometimes a man might gain a staff appointment after doing some special research work and without serving as registrar. Some entered the municipal service, where they got excellent experience with a varying amount of supervision. Nearly all the routes ensured that the surgeon gained experience under the supervision of senior men. Fortunately the instances were rare in which men who had not even held a house appointment went straight into practice and attempted major surgery. It must be admitted that the surgeon could not be standardized any more than the general practitioner, but it should

be possible to ensure a greater minimum of knowledge and experience in everyone wishing to become a surgeon.

The responsibility of the profession to the public was such that adequate guarantees as to the sufficient training of anyone wishing to practise major surgery should be furnished. The American College of Surgeons had a scheme whereby everyone who wished to become a Fellow of the College was required to undergo a strict and extended apprenticeship after qualification. It was probably true that in none of the higher British surgical qualifications was supervised practical experience sufficiently insisted on as an essential preliminary for the candidate. Some qualifications indeed were open to the criticism that they seemed more in the nature of competitive examinations than tests designed to demonstrate a candidate's skill and experience of surgery.

In spite of the criticisms that might be made as to surgical training, the general level of surgery in this country was very high, and the position of the surgeon in the community was probably more respected than it had ever been owing to the great and often speedy benefits he brought to many patients. The surgeon had gained the confidence of his fellow citizens to such an extent that he was often expected to do the impossible. The public appeared to think that if only the surgeon would do something, good was sure to result. Some of the most difficult moments for the surgeon were those in which he felt it necessary to advise against operation when the relatives clamoured for something to be done.

Rewards of the Surgeon

The life of the surgeon was of absorbing interest, whether from a humanitarian or a scientific point of view, or from the point of view of that less praiseworthy but common desire to obtain benevolent power to control the destinies of other mortals. To no man was the destiny of human life so often delivered. As a judge he had not only to give the verdict but himself to carry out the sentence. His power of speedy diagnosis and decisive action in a crisis was of the greatest value. A famous physician-dramatist had said: "He is surrounded by respectful and even adoring acolytes, and he holds the power of life and death over helpless persons. If he is to avoid madness he must stand aside from the business from time to time and deride himself and his colleagues." Mr. Cope thought that it would be sufficient if each surgeon limited his derision to his own failings.

In some respects the surgeon of to-day was more isolated than his forerunner of fifty years ago. At the beginning of the modern era it was customary to have regular consultations between the members of the staff of the large hospitals. This practice had fallen into disuse. Each member of the staff worked on his own and might seldom see his colleagues. There were welcome signs, however, that a system of co-operation might soon be general. The advantages of the group system were becoming recognized. Here the diagnosis made by the surgeon was discussed, challenged, or confirmed from their respective points of view by the physician, the pathologist, and the radiologist, and all to the patient's benefit.

The competent surgeon, said Mr. Cope in conclusion, was assured of an honoured place in the community. To gain the high regard of his fellow surgeons counted for more than any social distinction. If opportunity offered he might have the extra happiness of pursuing some useful work of research. His material reward was greatly varied. Ambroise Paré wrote of a patient who "was cured by the grace of God and made me a handsome present of such sort that I was well contented with him and he with me." But the young surgeon often had a long period of lean years, earning a bare subsistence. Even when elected to the staff of a hospital he might find it hard to make ends meet. But this unsatisfactory state of affairs was likely to find its own remedy. Owing to the decentralization of surgery it was unlikely, and perhaps undesirable, that the rewards would ever be as great as they were in the opening days of the new era. The man who entered the surgical profession chiefly to make a fortune had already made a mistake. The best reward must be always the satisfaction of knowing that interesting, useful, and skilful work had been faithfully performed.

Footnote on Lister

In seconding a vote of thanks proposed by Sir William Willcox, Sir StClair Thomson added a footnote to what Mr. Zachary Cope had said about Lister's appearance before the Medical Society of London. He said that he himself had been present in that very room in 1883 when Lister showed the first nine cases of fractured patella in which the joint had been opened and the patella wired. He himself was house-surgeon to Lister at that time and collected and wrote up those nine cases for his chief. It was true that the first cheer which Lister got after five years in London was on that occasion, but it ought to be added on the other hand that one of the most distinguished surgeons of the day who was presiding made the remark: "*C'est magnifique, mais ce n'est pas la chirurgie.*" Lister was very depressed after that reception, in spite of the applause, because at the meeting different surgeons had felt the knees of the patients and had asked: "Is the wire really in there? And is this man a bus conductor, running up and down on his bus? Well, if one of these men had a pyaemia and died, Mr. Lister ought to be tried for manslaughter." Sir Eric Erichsen said that the knee-joint, like the chest and the abdomen, should always be protected from the invasion of the injudicious surgeon. Sir StClair mentioned this to show the changes which had taken place since that time.

Correspondence

Hospital Posts: Responsibility under Supervision

Sir,—During the next five years from 2,000 to 2,500 students will qualify in medicine every year. Owing to the dispersal of teachers, the utilization of makeshift quarters, and the acceleration of clinical studies, their training may be less adequate than in peace time. It will be lamentable if the strain of war-time practice is imposed on these young people without further preparation. Yet most of our hospital appointments have been indefinitely prolonged by the outbreak of war and the normal turn-over of house officers has ceased. This is doubly unfortunate, as there never was a time when the hospitals of this country were more closely integrated or when the advice of consultants and specialists was more uniformly available. Surely this is the ideal opportunity for beginning the system of a compulsory hospital appointment of at least six months' duration immediately after graduation. The rotating service, so usual in Canada and the United States, whereby a man moves through the various departments during one or two years of hospital appointments, would not be practicable, but the exact nature of the appointment does not matter greatly. What is important is that a man should be in responsible charge of patients and yet supported by expert assistance; that he should be living in residence with men and women similarly employed, helping them with a transfusion or a casualty, taking an occasional week-end duty in another department, and talking shop at every meal in the residents' dining room. The growth in mental stature and personality during this period is very great, and it is silly to send men and women to the individual responsibilities of war without it, when the probationary period can so usefully be employed in hospital.

There are in Great Britain some 80,000 beds in voluntary hospitals alone and a total of over 200,000 beds in voluntary and public general hospitals. It would not be difficult to allot each hospital region its quota of graduates every quarter, and a good deal of option and free choice could be exercised within such a system. Complete maintenance plus a salary of £100 per annum would be a fair remuneration for these junior house officers, and the hospitals could then be officered on a more generous scale than has existed in the past or than is compatible with the rates of pay in the present Emergency Medical Service.—I am, etc.,

Radcliffe Infirmary, Oxford, Oct. 10. L. J. Witts.

Blood Groups in Great Britain

Sir,—In your issue of September 30 (p. 712) Dr. Edward Billing stresses the importance of the genetical and ethnological data on the O, A, B system of blood groups, which should be obtainable from the extensive activities of the blood transfusion service.

With the co-operation of the sectors and depots of the London area we were able, at the Galton Laboratory, to accumulate data on over 58,000 persons, which we put on record at the International Genetical Congress at Edinburgh last August, and which will be published in more detail in the *Annals of Eugenics*. Much of this material has since been subdivided for sex, but in cases in which forms have been already distributed to a large number of hospitals it has not always been possible to effect this subdivision. The Scottish empanelling centres are, however, now sending in material completely classified for blood group and sex. This we regard as of the highest importance. We should, therefore, like to appeal to all empanelling centres now active to co-operate by sending in from time to time numbers classified in eight classes. By so doing they will not only swell the totals and so throw light on points which require very large numbers for their elucidation, but will open up the field, at present wholly unexplored, of the homogeneity or heterogeneity in respect to blood groups of the population of these islands.—We are, etc.,

R. A. Fisher,
G. L. Taylor.

Galton Laboratory Serum Unit at the Department of Pathology, University of Cambridge.

Blood Transfusion Technique

Sir,—The booklet describing blood transfusion methods recently circulated by the Medical Research Council contains a section on the adaptation of certain apparatus to the vacuum method of blood collection described by us in the *Lancet* (1939, 1, 388). The advice given in this section is unsatisfactory, and, if followed, will lead to so many failures that its circulation is regrettable. The chief defects are as follows:

Type of tubing to be used for blood collection.—It is necessary for smooth working that pressure tubing should be used. If the tubing distributed by the M.R.C. (No. 8, 3/16th inch internal bore) be used as they suggest it will collapse under the influence of the vacuum and the flow of blood will be impeded. A six-inch length of tubing is also too short for convenience, and about nine inches should be used.

Type of collecting needle.—The 15/10 needle has great advantages over the 24/10 size recommended by the M.R.C. In the first place it simplifies venepuncture, which is an important consideration when blood has to be collected by workers with little experience from donors who are not specially selected for the large size of their veins. The smaller needle will fill the bottle just as efficiently as the larger one, which is in fact more likely to be obstructed by collapse of the vein on to its orifice. The 15/10 needle has the further advantages of lower cost and uniformity with the needles recommended by the M.R.C. for blood administration.

Preliminary filling of the tube with citrate.—We have now performed several hundred collections using dry-sterilized apparatus as originally described, and have never encountered any difficulty due to clotting of blood in the tube. We do not therefore see any reason for this measure, and we disapprove of it because it increases the risk of contamination which our method was designed to minimize and which it has almost succeeded in eliminating. We have cultured seventy bottles of preserved blood collected at this hospital during the early days of the war, in some cases by junior officers recently introduced to the technique. After removal from the refrigerator these bottles were incubated for twenty-four hours before the cultures were made, and they have all been found to be sterile. This desirable standard of sterility will not be maintained if unnecessary manipulations are introduced.—We are, etc.,

C. R. Boland,
N. S. Craig,
A. L. Jacobs.

Mile End Hospital, London E., October 9.

Treatment of Fractures

Sir,—In an annotation of Trueta's book on war wounds and fractures (*Journal*, September 30, p. 694) the closed-plaster or Winnett-Orr treatment of infected fractures is described as a method which "contrasts sharply with all accepted surgical principles." This observation is inaccurate and should be corrected, because it encourages a prevalent and somewhat dangerous view that the Winnett-Orr technique is a no-drainage method.

The treatment is actually based on four accepted surgical principles—namely, excision of wounds, free drainage of infected tissues, immobilization of injured soft parts as well as of bone, and protection from oedema by firm external support. The only practice which is abandoned is that of frequent inspection and dressing of the wound, and this is not an accepted surgical principle. It is a practice which is often harmful, has been given up in the treatment of varicose ulcers, and is rapidly disappearing in the treatment of other wound infections. But because the wound is covered with plaster and is not dressed it does not follow that it is not drained. The observation that "no provision is made for drainage or dressing" is very misleading. Provision *must* be made for drainage, and the drainage must be wide, free, and generous. Every infected plane must be freely incised, every recess carefully packed, and the wound converted into a wide open crater. Treatment should in fact be guided by the usual and accepted principles of surgery. The only instinct which the surgeon need suppress is that of demanding a clean dressing. Discharge is harmless even if it accumulates in the dressing and plaster.

Having accepted this, the results are no longer to be described in the terms of your annotation as "extraordinary," "astounding," "revolutionary." What is more reasonable than to immobilize a fracture, drain the wound, and refrain from meddlesome interference? Why should we be astounded that the fracture unites and the wound heals? It is true that by this technique limbs can be saved however grossly comminuted the fracture, however severe and widespread the infection, and however complete the destruction of skin. It is true that amputation has almost disappeared from the repertoire of the traumatic surgeon, and that the mortality has been reduced to a negligible fraction. It is a fact, moreover, despite your reviewer's suggestion, that the method has already been tried out fully in this country in many hundreds of cases over a period of no less than ten years, and that in several fracture clinics it has long been adopted as part of routine treatment. The crushed and mangled limbs of severe motor crashes, which differ in no respect from the injuries of modern warfare, are restored to normal in a very large proportion of cases. But the technique will gain its deserved popularity by proving its soundness and reliability rather than by proclaiming it as an astonishing departure from accepted principles.

Furthermore, we must recognize that it is the second-best and not the first-best treatment of an open fracture. However efficient the treatment of an infected fracture may be, recovery can never be so rapid, so certain, or so complete as when the infection is avoided. The ideal treatment of an open fracture is to convert it into a closed fracture at the first possible moment, and in this way to gain the advantages of rapid union and freedom from bone infection, sequestration, muscle fixation, and adhesion formation, which characterize the repair of closed fractures. The wound is completely excised, devitalized tissue in which organisms can multiply is removed, haemostasis is secured, *no catgut or any other foreign body is buried*, and the skin alone is sutured. A Thomas's splint, plaster slab, or plaster cast with a large window is applied, the wound is exposed to the air to keep it dry, and the limb is elevated to prevent oedema. In many cases first intention healing is secured and recovery is complete in less than half the time which is necessary for the treatment of an infected fracture. Moreover, if the excision fails and infection develops nothing has been lost. The skin sutures are promptly removed, the wound is packed with gauze, and treatment is continued as for an infected fracture.

The two methods are complementary, and the highest standards of fracture treatment demand that both should be used. I submit that the indications are as follows:

Excision and primary skin suture to be used as the first line of treatment, open drainage and enclosure in plaster to be adopted only when this has failed: (1) if the wound is less than six or eight hours old; (2) if the skin flaps can be sutured without tension; and (3) if the patient can be under observation for a few days.

Excision, free drainage of wound, and complete enclosure in plaster to be used: (1) if the wound is more than six or eight hours old; (2) if the skin has been avulsed or is of doubtful viability; (3) if the skin flaps cannot be approximated without tension; and (4) if the patient must be evacuated at once and cannot be kept under observation.

Amputation to be performed only when the main artery is destroyed, so that gangrene is inevitable.—I am, etc.,

Liverpool, October 6. R. Watson-Jones.

*** We welcome Mr. Watson Jones's criticism of our review of Professor Trueta's book, but still maintain that the results obtained by Trueta's methods can truly be described as "astounding."—Ed., *B.M.J.*

Anaesthesia in War Time

Sir,—Since the war of 1914–18 the spinal route has gained prominence for anaesthesia of the abdomen and legs. Its usefulness during hostilities merits more notice than "G. D. G." gives it in his admirable discussion in the *Journal* of October 7 (p. 744). Some arguments follow.

In war, hospital organization has to prepare for big rushes of work and for transplantation, since hospitals may have to move suddenly. Cutting down "impedimenta" counts, in which respect "spinal" scores. The handy Luer-Lok syringes and needles, heralded by Pilkin and beautifully adapted to thecal work, fit compactly in a pocket case, and twelve ampoules of anaesthetic pack into a cardboard container. The relative uniformity of dose facilitates use. Posturing the patient preparatory to puncture is routine, and will, of course, entail extra care in already wounded patients, and, in some leg wounds, a small dose of evipan. It is fair to assume even in a C.C.S. that tables could be sloped into a mild Trendelenburg position.

Administration takes but a few minutes. Supervision may be left to an experienced nurse showing aptitude for reassuring patients if timid. The anaesthetist fully conversant with the technique, having injected the drug and seen the operation proceeding satisfactorily, would be available to render the same service to a second patient, and so on, dealing with four or more cases in the course of an hour. Multiple surgical teams often work in one large theatre or adjacent theatres, and the anaesthetist would be on call to deal with a threat of unexpected deterioration in any patient. Great economy in apparatus and personnel results and helps the staff to cope more quickly with sudden crowds of casualties. Subsequent management of the patient is easy and orderly, involving little more than the rule of the recumbent posture for a day or two. It is, in fact, automatic, as the patient is self-controlled, whereas restraining the violent antics of strong men during recovery from (or induction into) general anaesthesia often greatly taxes the nursing personnel and wounded structures. It avoids the danger of using inhalants where a patient arrives with mucosa already inflamed by poison gas or ordinary respiratory infections, and eliminates the risk of ether explosions, which is no less in circumstances of war.

The value of spinal anaesthesia may, from the foregoing, seem assured. Before adopting it we must also cater by other means for wounds above the mid-dorsal region and comply with two requisites. First, an anaesthetist (or sometimes the surgeon) should be skilled in the procedure. Intrathecal injection entails certain refinements in administration which, like its possible pitfalls, are only mastered by experience. Secondly, investigations of the ability of the war wounded to withstand the fall of blood pressure consequent on spinal anaesthesia must be carried out. Thus, exsanguination (as in ruptured ectopic gestation) is a partial contraindication. Shock from wounds of leg or belly is not necessarily a bar, for when the pain derived from the wound is eliminated by the anaesthetic the comfortable relief not only calms but revives the patient. The resilience of a soldier's physique diminishes some of these dangers. The best single guide to safety of spinal anaesthesia will be the blood pressure, which is tested as a pre-operative routine. Already doctors of belligerent States may have collected manometric evidence on this crucial point. Certainly such data are essential prior to the regular use of the method for war wounds. As a possible boon to hospital authorities and the victims of war, spinal anaesthesia may have a place in war surgery, as it undoubtedly has in peace.—I am, etc.,

Bristol, Oct. 14. A. Wilfrid Adams.

Sir,—The remarks of "G. D. G." call for some comment. It can hardly be denied that chloroform and ether anaesthesia, requiring as it does nothing more complicated than bottle and mask, is likely to prove the most widely applicable method under war conditions, but the insistence on Shipway's apparatus largely removes the advantages of simplicity and portability, and even familiarity, to a large number of medical men.

Chloroform has acquired a bad reputation mainly for two reasons—the frequency of cessation of breathing during deep anaesthesia and the occurrence of primary syncope. The cessation of breathing that so commonly occurs is the main cause of so many anaesthetists and surgeons disliking chloroform intensely; it gives everyone concerned such a fright. Yet Dr. Primrose of Glasgow has pointed out that this is really the action of a defence mechanism of the body to prevent fatal overdosage. It is an indication to cease administration of the anaesthetic, and the patient will recover spontaneously. It is, however, the statement that chloroform and ether are suitable agents for the rapid induction of anaesthesia and, still more, the suggestion that analgesia and not full anaesthesia is all that is required before commencing operations that arouse the most serious misgivings.

It was pointed out to me some years ago that in cases of primary syncope under chloroform it nearly always happens that (1) the patient was not fully anaesthetized, and (2) some manipulation, however slight, had been begun. I am convinced that it is for this reason that such procedures as manipulations, circumcisions, etc., have a particularly bad reputation in this respect. The operation is short, there is a tendency to give just a "whiff" of anaesthetic, and the shock-producing part of the procedure is reached early. To avoid this catastrophe no anaesthetist should be hurried in the induction of chloroform and ether anaesthesia, and nothing whatever should be done until full anaesthesia is reached. The old adage, "plenty of air and plenty of chloroform," should be taken to mean not chloroform in large doses but deep enough anaesthesia. "Plenty of time" would be a better expression. Lastly, my recent experience would indicate that as regards recently qualified men capable operators of the more common gas-oxygen machines are not likely to be as scarce as might be supposed.—I am, etc.,

Burnley, Oct. 12. A. Duff.

Sir,—Your correspondent "G. D. G." gives the impression that in the last war British and French anaesthetists showed a superiority to their American colleagues by their fearless use of chloroform, and praises their greater speed in administration. His opinions are based on war-time experience and as such deserve respect, but might I quote from Henry K. Beecher's *Physiology of Anaesthesia* (p. 256):

"For years laboratory workers have been warning of the dangers inherent in the use of chloroform; yet the employment of this toxic agent continues in many clinics, chiefly abroad. Presumably the users justify this course by considering that damage follows the use of chloroform only in the exceptional, badly managed case. This is not correct. It has been rightly said that chloroform anaesthesia is synonymous with chloroform poisoning. . . . Susceptibility to the drug varies greatly from animal to animal and from man to man. A brief anaesthesia with chloroform may produce little liver damage or it may prove fatal."

Laboratory experiments show that in *every* case of chloroform anaesthesia some liver damage is produced. The

extreme (and unpredictable) case constitutes delayed chloroform poisoning, but in all the others a less degree but analogous form of poisoning is produced, which increases to a maximum for forty-eight hours after the administration. Much work has been done on this, and surely it does not become the British to belittle the more reasoned attitude of the Americans to the agent. Even apart from laboratory work, it is known clinically that the special inherent dangers of chloroform administration—relative overdose and primary cardiac failure—are particularly formidable, especially in the young athletic type, the very class of patient which, as your correspondent points out, is the one under consideration, and especially in the emotional and terrifying surroundings which are known to predispose to hyperadrenalism and consequent ventricular fibrillation.

If hurry must be a factor to provide for, why cannot the safer agents, as vinesthene, alone or in combination with ether, be used for induction prior to ether? The accumulated knowledge of a century should be sufficient to relegate chloroform to a last resource, to be used when no other is available. It is as well to remember that the first warning fatality in chloroform induction occurred in no more than a year following its introduction as an anaesthetic agent.—I am, etc.,

Birkenhead General Hospital, Oct. 7. R. L. Wynne, D.A.

Radium Precautions

Sir,—Having read Mr. A. R. Greatbatch's memorandum (*Journal*, October 14, p. 782) I am surprised that it was ever considered necessary to stop radium treatment, and I am more than ever pleased that the Royal Sussex County Hospital did not send its radium to be buried in London (a curious place to choose anyway), but continued to use it.

Excluding bomb treatment, the amount of radium employed in any one case is not large, and the chance of that patient being blown to bits (a necessary precursor to the scattering of the radium) must be very small. I wonder how many patients in Barcelona were actually blown to bits while in hospital. It is true that we anticipate bigger raids, but (1) our defences are much better, and (2) London, for example, is much bigger and the patients, therefore, more dispersed.

With regard to the storage of radium not actually in use, I regret that although the Board of the Royal Sussex County Hospital granted my request that we should continue to use our radium, they decided to avail themselves of the generous offer of a member of the Board to pay the cost of a bore-hole, and to proceed with this work, which, in my opinion, is quite unnecessary. The chance of a direct hit on any one building is small: the chance of one particular part of the building being hit is even smaller. What, then, are the chances of a bomb passing through roof and floor after floor of a substantial building (gradual resistance as against solid concrete), penetrating into the basement, through sandbags, and waiting to burst until it strikes a small steel safe containing drawers of comparatively plastic lead, in which the needles lie—and these needles must be finally burst open if radium dust is to be expelled. It is a common experience that even if this extremely unlikely sequence of events occurs the masonry of a building is likely to fall in over the damaged lower parts, and so spread would be prevented.

It is quite obvious that in war one must take certain risks. In this war we run the risk of being over-organized to such an extent that by the time we have carried out all the safety regulations we shall have no heart to strive for victory. I suggest that we should go about our work as nearly normally as possible, even if this means taking risks. In this way we may preserve our patients' lives and our own morale.—I am, etc.,

Hove, Oct. 14. H. J. McCurrich.

Sir,—As provincial radiologists may we say how much we endorse Dr. S. Cochrane Shanks's letter in the *Journal* of October 7 (p. 741).

This is an evacuation area, and since the war our population and demands for radium treatment have increased, more especially as many cases formerly sent to London hospitals have now to be treated locally. In spite of this fact the Radium Commission saw fit to bury our stock of radium at the outbreak of war, and no information is forthcoming as to when it will be returned. We fear that if the date of its return is delayed patients may be buried as well as radium.—We are, etc.,

G. P. Norman.
Eastbourne, Oct. 9. E. Owen Fox.

Sir,—May I reply briefly to Mr. Stebbing and Professor Russ (*Journal*, October 14, p. 782). There is a deep and growing anxiety in the minds of many of the profession about the existing radium situation: a feeling that the risks of radium being scattered by bomb explosion are remote, and that the risks of poisoning from this scattering are still more remote. May I suggest that the Radium Commission issue a statement indicating the evidence for their belief that the risks of poisoning from radium inhalation were grave enough to warrant withholding, during the past six weeks, radium treatment from those who urgently needed it.—I am, etc.,

London, W.1, Oct. 16. S. Cochrane Shanks.

Gas Protection for Tracheotomy Cases

Sir,—In the *Journal* of September 16 (p. 622) Mr. W. A. Mill refers to the necessity of providing gas protection for tracheotomized patients. It may interest readers to know that a patient here who underwent total laryngectomy by Mr. Colledge last April has had his gas mask adapted by Messrs. Mayer and Phelps. The canister has been removed from the mask and is now carried strapped to the front of the chest. A stout rubber tube connects it with a soft rubber attachment similar in appearance to the face-piece of a gas-anaesthesia apparatus. This is fastened over the tracheotomy opening by means of a strap round the neck. The rest of the mask simply constitutes a protection for the face and eyes, and is not connected with the canister.—I am, etc.,

Glasgow, October 10. Derek Brown Kelly.

Treatment of Pulmonary Oedema from Gas

Sir,—After reading Colonel E. M. Cowell's articles about chemical warfare (*Journal*, October 7, p. 736, and October 14, p. 778), may I suggest the treatment of pulmonary oedema of gas casualties by the immediate intravenous injection of 10 c.cm. of a 10 per cent. or, still better, 20 per cent. calcium solution. This injection has already proved effective for a long time in many types of acute oedema, toxic or angio-neurotic. Its effect seems to depend on two factors. The hypertonic solution withdraws extravasated fluid back into the circulation and at the same time the calcium reduces the permeability of the capillary walls.

Since the technique is simple, requiring only a 10 c.cm. syringe and an ampoule, it would be possible to give this treatment at a first-aid post. It is to be expected that the results would be best if the injection were given as early as possible, perhaps even prophylactic. There are many calcium preparations for intravenous injection. At the moment the most satisfactory ones are, in my opinion, solutions of calcium laevulate, available up to 10 per cent., or calcium glucono-galacto-gluconate, available up to 20 per cent. The last preparation is also suitable for deep intramuscular injection.—I am, etc.,

London, W.5, Oct. 15. H. L. Winter.

Psychological Casualties in War

Sir,—It is regrettable that Dr. Maurice Wright has not seen fit to answer the criticisms of his two articles on psychological casualties during war in your issues of September 9 and 16. I made my last letter (September 30, p. 701) vigorous enough, I thought, to stimulate a response, and Dr. Wright will be aware that the validity of a writer's views is bound to be questioned if it is seen that he is not prepared to support his opinions when challenged. On one point in particular I asked for evidence—his statement that there were very frequent relapses among those cases treated by rapid methods. From

Dr. Wright's silence one can only assume that the evidence is not forthcoming, and that the assertion was made, as I suggested, purely on theoretical grounds.

The letter of Dr. J. A. Tippet (*Journal*, October 7, p. 742) appears to provide a partial answer to the question. He says, in reply to Sir Arthur Hurst, that in the course of his work in different "shell-shock" hospitals he saw relapsed cases from Seale Hayne. This was only to be expected; it is a reasonable assumption that relapses occur with every form of psychological treatment. But that is not the point. Dr. Wright's argument was that "very frequent relapses" took place after rapid methods of treatment, and so far no evidence has been brought forward to substantiate it.

Dr. Tippet's experience as a battalion medical officer evidently differed from mine. No doubt he had longer experience in that sphere than I had, particularly as he says he saw many neurotic cases returned to duty after treatment, most of which, no doubt, were from his own battalion. He makes the statement that men, treated by rapid methods and returned to the line, "if they did not relapse were generally quite useless as no one felt inclined to trust them in an emergency." The operative word here would seem to be "as." Of course, if these returned cases were looked upon as a species of psychological half-caste they naturally would become less reliable. I have published records of ten patients with typical "shell-shock" treated by me as battalion medical officer who were able to return to duty in the line after a few days' rest and treatment, and to the best of my knowledge carried on perfectly capably afterwards. With your permission, Sir, as it provides an important illustration of the point, I should like to reproduce a brief description of a case published in 1918 (*Canad. Army med. Bull.*, September, 1918).

Private B., aged 27, was on duty in the front-line trenches when three trench mortars exploded near him. He was brought down to the aid post with the help of two stretcher-bearers, and when seen sat huddled up, trembling, and shivering in very limb. He looked a limp nervous wreck and could scarcely stand without support. His mind seemed dominated by an obsessing fear; he kept groaning and moaning and started at practically every sound. His hands jerked and trembled so much that he could scarcely pull off his gloves when asked to do so. He had considerable difficulty in speaking; it took him about two minutes to give his regimental number in jerky tremulous accents. He complained of pains in the head and giddiness. He was given morphine and kept for the night in the aid post. The following morning he had greatly improved; he was able to stand up without support, was calm and composed, and spoke without difficulty. The shaking had gone, with the exception of a tremor of the hands. He complained of headache and giddiness, and declared that he had no memory of being brought down to the aid post the night before. The last thing he remembered was being at the entrance to a dug-out after the second trench mortar had fallen. He was kept under observation in the aid post for six days longer; by that time all his symptoms had disappeared with the exception of the amnesia, which still persisted, and he was sent back to duty. He was still serving with his company a month later when I left the battalion.

If Dr. Tippet means his remarks to be taken as a general statement that all cases of "shell-shock" who returned to the front line after treatment were useless he is demonstrably mistaken. As I have previously recorded (*Journal*, July 8, p. 63), I have known men to obtain decorations for bravery after an attack of "shell-shock."—I am, etc.,

London, W.1, Oct. 14. FREDERICK DILLON.

Psychological Treatment Centres

SIR,—Dr. A. C. D. Telfer issues a call to psychotherapists to enlist in service "for defence of the nation's nerves" (*Journal*, October 7, p. 743). Most of us are at present awaiting the call for service with mental casualties, and one can but agree with Dr. Mayer-Gross and others who deplore the lack of arrangements for ensuring early contact between therapist and civil casualty.

As to the local medical officer of health being the "rallying-point" for a psychiatric service, public health services are not so lightly established. What of the local government committees, education and finance? What of the taxpayer and ratepayer? The psychological point of view is spreading slowly, but many public bodies need convincing. But have we, as a body, been very convincing? In what would Dr. Telfer have us enlist; and having enlisted, how would we serve? As psychiatrist to a county authority I discovered some of the difficulties.—I am, etc.,

London, W.1, Oct. 9. R. LOUIS ROSE.

War Hospitals Supply Depots

SIR,—I should be very grateful indeed to any of your readers who can let me have, through your columns, advice and suggestions on the following points regarding the war hospital supply depots. Working parties, to supplement the equipment of Service hospitals, are now actively engaged throughout Great Britain and Northern Ireland. Much of the work they are doing is based upon experience gained in the last war, but changes have taken place in twenty years, as, for instance, with the treatment of the septic wound, which has been changed by many from Carrel-Dakin irrigation to the closed vaseline dressing of Winnett-Orr. Plaster-of-Paris will therefore be used much more than before, and the question arises whether the available stocks of proprietary prepared bandages (in tins or cartons) are sufficient, or should the depots undertake this work? If so, should the dry book-muslin bandages be prepared or should the finished bandage (complete with plaster-of-Paris) be made and preserved in tins?

Bed sand-bags do not feature in the official list—although surgeons' masks in three sizes and abdominal swabs in several varieties, following Army pattern, are being made in most depots—and yet sand-bags almost always seem to be insufficient. Should they be covered with waterproof sheeting, which is easily cleaned by a damp cloth from blood, urine, pus, etc., or by thick calico, which is easier to sew, more serviceable, and more lasting? Sphagnum moss gives rise to another question which is constantly being asked and which should be settled before quantities of this material are collected. Is it needed and is it of any value? It is not yet possible to be certain whether there will be a scarcity of cotton-wool and cellulose in the future, but one wants to be sure that sphagnum moss, if collected, is really going to be used and not thrown out as it was in many places in the last war. The collecting, drying, picking, and placing in bags is too tedious and too wasteful of time unless the result is really worth while. Many nurses found that sterilizing was impossible and that the smell became unbearable, whilst the patient found the dressing about as comfortable as a bag of straw upon his abdomen. Is there any specific therapeutic value in the moss *per se*? Amputation stump caps are not included in the official list, and yet these will save endless dressing and do away with the bandages which only hold on with the greatest difficulty to a conical stump.

These are only a few of the many practical questions which are being asked daily. An answer and suggestions from practising surgeons with practical knowledge of dressings and materials would be greatly appreciated.—I am, etc.,

Belfast, Oct. 10. IAN FRASER.

Specialization in Treatment of War Wounds

SIR,—I am so keen on the subject of specialization that I feel I must put forward a few ideas on the subject.

In the last war we all had to learn by experience what was the best way to treat a wound, but as the war went on cases came to be more and more grouped under men who had had special experience in a particular class of case. My experience was with chest wounds, of which I reckoned about one thousand passed through my hands. In these cases I found it essential to keep a daily record of the physical signs, such as the position of the apex beat, the level and extent of any dullness present, etc., as the signs could alter so quickly. That is only a small detail, but my point is that gun-shot wounds of the chest should be under men who have had experience in such cases. The same applies to gun-shot wounds of the brain, face, abdomen, thighs, etc. I do not think that in war time specialization can be carried too

far. My job was to see all chest wounds on admission, decide whether operation was necessary or not, have the foreign body located by *x* rays, and send the report to the surgeon with the patient for removal of the foreign body. After operation I looked after the patient until he was able to be evacuated to the base.

Of course one got mixed cases of chest and abdomen, chest and spine, wounds of the heart, etc., but I am sure that, so far as possible, specialization in one particular line saves lives and prolonged convalescence.

I used to come across American doctors operating on our men at C.C. stations long before any American troops were in the line. In that way they learnt experience on our men, which always worried me at the time; some were quite good surgeons and some were not.—I am, etc.,

Swanage, Oct. 12. W. A. Rees.

Organization of First-aid Posts

Sir,—I have read with keen interest Dr. C. Seely's article on this subject in the *Journal* of September 30 (p. 697), and also Dr. W. N. Leak's able comment (October 7, p. 744). I do not think it is fair either to the patient or to the members of first-aid parties to leave responsibility for disposal of cases in the hands of these men. My experience during the last war was that properly trained men were capable of rendering immediate first aid and bringing the patient to the doctor, from whom the patients were able to receive such further attention as was needed to prepare them for transport to the advanced dressing station, but that few were capable of "exercising discretion in the initial disposal of cases."

Surely the medical officer of the first-aid posts should have this responsibility? The aid post would then be able to discharge its proper function, as laid down in E.M.S./Gen/245, "to arrest haemorrhage, relieve pain, and so prepare those casualties who may be found to require institutional treatment that they can be transferred to the receiving hospital with the least possible harm—that is, by having taken steps to prevent any immediate deterioration." At the first-aid post the patients would receive the immediate and preventive treatment of shock recommended by Colonel E. M. Cowell (April 29, p. 883), and the minimum necessary wound treatment, morphine, serum, etc. Patients would be sent on to the receiving hospital when it was ready to deal with them. The first-aid post would then be fulfilling the important function of "acting as a buffer to the receiving hospital, and so preventing it being overcrowded by the less seriously wounded" and the moribund.—I am, etc.,

Stalybridge, Cheshire, Oct. 10. Eric M. Molesworth.

Manzullo's Tellurite Test for Diphtheria

Sir,—The Manzullo application of potassium tellurite to pharyngeal exudate attracted considerable attention. Your pages in June, 1939 (pp. 1273 and 1275) describe results given by the test which may be misleading.

With the encouragement of Dr. E. C. Benn, the superintendent of the Leeds City Hospital for Infectious Diseases, I have tested 200 successive patients admitted with membrane or exudate. The problem was, Would the Manzullo test help the clinician? Of 113 patients who appeared clinically to be suffering from diphtheria, 103 (91 per cent.) gave a positive swab, while only 96 (85 per cent.) gave a positive tellurite result. Of the 17 tellurite negative, 15 gave a positive swab and one proved fatal. Thirty-nine patients "clinically negative" gave 37 (95 per cent.) negative swabs, while only 21 (54 per cent.) gave a tellurite negative result. Put in another way—of 152 patients, 113 appeared positive clinically and 39 negative; this diagnosis was supported bacteriologically in 92 per cent. while the tellurite test agreed in only 77 per cent. In the "doubtful" clinical group (48 cases), 35 (73 per cent.) were bacteriologically positive, but of these only 18 (37 per cent.) were positive by the Manzullo method also. In this doubtful group the bacteriological evidence, essential for final diagnosis, was supported by the tellurite result in only 23 cases (18 positive, 5 negative)—that is, 48 per cent. One must therefore conclude that the test is of no real help to the clinician, who must found his treatment in the first place on clinical signs.

Professor McLeod very kindly examined cultures from all the 200 cases. There were 75 gravis, 61 mitis, 1 atypical intermedius, and three untyped positive.—I am, etc.,

Leeds, Oct. 5. Hester E. de C. Woodcock, M.B., D.P.H.

The Patellar Sign and Osteo-arthritis

Sir,—Dr. T. C. McCombie Young's letter on patellar crepitus and osteo-arthritis in your issue of September 30 (p. 702) is very welcome as it provides exactly that control group which it is impossible to obtain in a rheumatism clinic—a fact recognized by Dr. McCombie Young, who has indeed done us signal service by his observations. He is, however, mistaken in suggesting that a positive patellar sign is held at the Charterhouse Rheumatism Clinic to be an indication of the actual onset of osteo-arthritis.

It is a fact that every case of arthritis, without exception, whether the knees are affected or not, gives a positive patellar sign. Therefore patellar crepitus in a rheumatic patient obviously constitutes a threat that osteo-arthritis might later develop. Drs. Walker and Sandell have recently demonstrated in a series of sections that crepitus is due to fibrillation from destruction of cartilage. It is for this reason that patients suffering from muscular rheumatism, fibrositis, bursitis, or synovitis are grouped according to the patellar sign. If this is negative even those with quite severely swollen joints are labelled as synovitis or capsulitis, since these clear up and leave no trace. If positive, then even the mildest of rheumatic cases is placed in the group named "early osteo-arthritis" (although osteo-arthritis under proper treatment will seldom develop). The term "early osteo-arthritis" may not be strictly logical, but it must be remembered that it is applied only to rheumatic patients and not to healthy individuals.

Dr. McCombie Young finds that in 15 per cent. of his recruits cartilage was degenerating. The bearing on the aetiology of osteo-arthritis is obvious, and the percentage does not seem too high considering the prevalence of that disease in later decades. Can Dr. McCombie Young tell us whether the 15 per cent. of positives (*a*) gave a family history of cripples, and (*b*) had suffered from rheumatism (excluding fever) in childhood? If not, possibly in further examinations of recruits these questions might be resolved. No doubt the records will be available, so that in future we may find some of this group developing osteo-arthritis, thus confirming our view at the Charterhouse Rheumatism Clinic that osteo-arthritis is a disease which attacks people whose cartilage is constitutionally vulnerable and therefore easily damaged by friction.—I am, etc.,

London, W.1, Oct. 12. H. Warren Crowe.

Vitamin C in Black-currant Juice

Sir,—I should like, through the medium of your columns, to bring to the notice of my colleagues in the medical profession the virtue of matured, freshly expressed, black-currant juice syrup. The vitamin C content (77 mg. per 100 c.cm.) is 50 per cent. higher than that of the common citrus fruits—as a matter of fact it is considerably higher than that of any of the fruits easily obtained in England. Oranges and lemons may possibly soon be difficult to obtain, by reason of either cost or scarcity. Black-currant juice syrup forms a very efficient, in my opinion a better, substitute. Being depectinized it is easily tolerated by all, and especially by children of all ages. It is prepared in England from English fruit. The following is an analysis of its content.

Sugars.—Fructose, 25.4 per cent.; glucose, 26.0 per cent.; sucrose, 1.7 per cent.
Ash.—0.36 per cent.
Iron.—11 parts per million.
Vitamin C.—77 milligrammes per 100 c.cm. by volume, or 61 milligrammes per 100 grammes by weight.

The added sugar is inverted to glucose in the process of maturing. There is also a small proportion of organic iron.

I have for about a year prescribed this syrup in all my cases of gastric and duodenal ulceration, whether acute or chronic, with marked benefit. In all cases it has been well borne and in my opinion has mitigated symptoms.

There is evidence in medical reports that vitamin C is valuable in maintaining the integrity of terminal blood vessels. Possibly ulceration and haemorrhage in the intestinal tract may be due to vitamin C shortage. Being myself a general practitioner, cases of this type are not sufficiently numerous, and the period of observation is too short to enable me to make a full investigation on these lines. Perhaps someone with access to a large number of cases may be sufficiently interested to test this theory. I feel it has great possibilities. The fact that black-currant juice syrup has so large a content of natural vitamin C—and is most pleasant to the taste—may be a valuable asset in treatment. We know that ascorbic acid is a constituent of vitamin C, but if the presence of vitamin P be confirmed, then vitamin C must be looked upon as a complex. I may add that a daily dose of 1 to 1½ oz. contains sufficient of this vitamin to maintain "good health." In cases of acute peptic ulcer the dose can be increased to 3 or 3½ oz.—I am, etc.,

Bristol, Oct. 9. W. H. A. Elliott.

Medical Students in War

Sir.—May I support Mr. R. B. Buzzard's protest (*Journal*, October 7, p. 746) against Dr. Elliot's reference to the emergency war service of medical students. The Minister's answer is tantamount to an accusation of profiteering if they are paid for their services. Why should not these willing and valuable auxiliaries be paid on a sessional basis, and on the same scale as that in force for panel practitioners when engaged in the same type of work? I would go further than Mr. Buzzard and assert that senior medical students by reason of their recent intensive training in hospital and casualty work, their youth, amenity to discipline, and physical fitness, constitute ideal assistants in casualty clearing hospitals. Furthermore, being free from the ties and abstractions of medical practice they can give their whole time to the service during an acute emergency. In these circumstances they are as much entitled to payment for their services as any other category of personnel on the pay roll of the Ministry.—I am, etc.,

Bradford, Oct. 14. A. Hayes Smith.

Evacuation

Sir.—On reading the "Medical Notes in Parliament" in the *Journal* of October 7 (p. 751) I was struck by Mr. Henderson Stewart's question regarding "the serious bodily condition of so many of the persons recently evacuated and whether an immediate inquiry into the health services of the cities of Scotland" should not be ordered.

I think the problem has been the same in every reception area, though perhaps more so in some than in others, and a certain percentage of children have arrived suffering from vermin, scabies, or impetigo. These three conditions are recognized as being most frequent among those who have an inherent dislike for soap and water; and if personal and domestic cleanliness were more universal "the large sums spent on the health services in the cities of Scotland," and elsewhere for that matter, could be considerably reduced.—I am, etc.,

Felton, Northumberland, Oct. 10. E. A. Welsh.

"Black-out" Problems

Sir.—Housewives, with their many anxieties, are being worried and made nervous by repeated calls from wardens who complain even of a glow through dark curtains, and this although an official notice directs only screening by dark curtains. Such screening appears more than sufficient for any military purpose, for scientific tests from effective air raid heights would show such illumination as an insignificant fraction or *nil*. Looking down from a mountain at 6,000 feet into a valley on a dark night, glimmers from cottages so screened could not be seen. Greater damage may be done to the community in creating neurasthenic states than could result from lighting of this type. Immured in darkened houses "where," in Milton's phrase, "glowing embers through the room teach light to counterfeit a gloom," there is ample cause for melancholy, and every stress should be avoided which may intensify depression.—I am, etc.,

Ilford, Oct. 10. V. J. Batteson.

Obituary

G. A. SUTHERLAND, M.D., F.R.C.P.

Consulting Physician, Paddington Green Children's Hospital

Dr. George Alexander Sutherland, C.B.E., who died at Amersham, Bucks, on October 10, was born in Aberdeen the third son of the Rev. James Sutherland, D.D. He was educated at the Aberdeen Gymnasium and at the Universities of Aberdeen and Edinburgh. He graduated M.A. at Aberdeen in 1882, and M.B., C.M. of Edinburgh in 1886, proceeding to the M.D. seven years later, having by that time obtained the M.R.C.P.Lond. and studied at Vienna clinics. Dr. Sutherland was for many years physician to the Hampstead and North-West London Hospital and to the Paddington Green Children's Hospital. He was elected a Fellow of the Royal College of Physicians in 1903 and served as president of the Section of Paediatrics at the Annual Meeting of the British Medical Association in Toronto in 1906, and was also president of the Section of Diseases of Children of the Royal Society of Medicine in 1912. In his earlier years at Edinburgh he had been house-physician to the Royal Infirmary, and an active member of the Royal Medical Society. He was the author of *Treatment of Disease in Children*, which went into a second edition, of the *Heart in Early Life* published in 1914, and his Lumleian Lecture before the Royal College of Physicians in 1917 was entitled "Modern Aspects of Heart Disease." He published *Cyclic Albuminuria* in 1900 and edited a *System of Diet and Dietetics in* EFZB. During the latter part of the last war Dr. Sutherland was a consulting physician to the Royal Air Force, and for his services received the C.B.E. in 1920.

HARVEY CUSHING

Sir Charles Sherrington, O.M., G.B.E., writes:

I should be glad if you would allow me, as one of the many who regarded Dr. Harvey Cushing with affection, a few words of personal tribute. It is just forty years since I first had the good fortune to come to know him. It was at Liverpool, and he was then on his way home to America from Kocher in Berne. He called on me at the Physiological Laboratory, and then prolonged his stay with us to some eight months. He was already interested in cerebral surgery. He joined with enthusiasm in the experimental work going forward in the laboratory upon the brain of the anthropoid apes. The day following a final experiment would find him early in the laboratory, devoting himself to making a series of drawings of the undissected brain showing its surface markings, blood vessels, etc., appropriately coloured, providing a valued addition to the maps and protocols of the day before. His drawings were beautifully executed, and the Royal College of Surgeons preserves at least one of them now. He had before coming to the Liverpool laboratory completed a memorable piece of experimental work on the cerebrospinal fluid; the findings of this, with his usual frankness, he put our laboratory fully abreast of, although they had not yet

actually seen the light in print. He became at once an "intimate" among our small company of research workers, mostly neurological. He had from all of us respect and affection. When in the latter part of the summer vacation the time came for us all to disperse I know he took with him lasting friendships.

Five years later I saw him in his own home in Baltimore. There I found him, house to house, beside his elder and close friend William Osler. "Close" describes the relation between them altogether too baldly. It was friendship whose intimacy and reciprocal devotion and loyalties can, for those who had not the opportunity of witnessing them in the life, perhaps best be understood from the pages of the "Life" which Cushing in later years wrote of Osler. Surely a "Life" which not the subject of it only but the authorship no less combine to make a tribute our whole profession may regard with pride as an example of brotherhood within its fellowship.

My own contacts with Harvey Cushing were throughout the years an unalloyed pleasure to me. On a trip to America one of the greatest rewards always was to have there a re-meeting with him. Conversely, to welcome him on this side gave when it happened a fresh zest to the whole routine of daily things. It was my privilege to know many of his pupils; if ever a teacher had the affectionate respect of all those who could call him "Master" it was Harvey Cushing. The unequivocal evidence and consciousness of this was, I think we should find, if we could know, perhaps among those assets of his life which he himself most prized. His death leaves our world the poorer by the loss of a personality of transcendent accomplishments and of singular charm.

Oct. 9, 1939.

Mr. Geoffrey Jefferson writes:

Harvey Cushing's was one of those vital personalities, rare in any profession or in any walk of life. Halsted undoubtedly exerted a profound influence upon him during the formative years of his more mature growth, and he was wont to tell an amusing story, too long to relate here, of their first meeting and his conversion from the ultra-rapid methods which were the vogue elsewhere. Halsted's insistence on the utmost care in the recording of every clinical and pathological fact, whether it might seem relevant at the moment or not, on the utmost gentleness in the handling of tissues, on the minimizing of blood loss and shock, on painstaking rather than brilliant operating, met with an instantaneous and understanding response in the young Cushing. He modelled himself upon his master and transferred the Halsted technique to a branch of surgery to which it had not hitherto been applied. His use of iron-dyed black silk for ligatures, his condemnation of catgut, and his applications of silver-foil dressings were copied from his master. The dominant figure in neurosurgery in Cushing's day was of course Victor Horsley, with Macewen looming more silently yet forcefully in the background. Cushing went to London hoping to work with Horsley, but found him so engrossed in his many pursuits that he felt that there would be little opportunity for him to learn. It would be interesting to speculate whether the preoccupation of Horsley with problems of neurophysiology would have left a mark on Cushing's work. His brief stay with Sherrington certainly did so. As it was, the more mechanistic work which he did in Berne on the effects of cerebral compression on blood pressure proved to be extremely useful to him in a practical way. We find him treating his patients and recording his experiences in the journals as if they had been physiological experiments on man. No surgeon in our time has maintained so high a level over so long a period.

Things were already going well for him at Johns Hopkins, where he had risen to be associate professor of surgery, when his bold diagnosis and fortunate operation on the man who was to become General Wood focused attention sharply on him. Cushing once recounted to me the full details of that famous case. He felt sure that it was this operation, witnessed by Cabot of Boston, which brought him to the Moseley Chair of Surgery at Harvard University (1912). The correctness of the choice was made apparent to the whole world by the publication in the same year of his famous book on the pituitary body. It would be absurd to attribute the rise of endocrinology to the fact of this book alone, but there can be no doubt that it profoundly affected medical thought. In 1917 his book on tumours of the nervus acusticus set the seal on his reputation. From that time onwards his work followed on predestined lines. It lay first in the classification of the tumours of the central nervous system, based on the observation that neoplasms tend to occur in certain situations, to be regional in type. It would be untrue to give the impression that this thought had not occurred to anyone else, but certainly Cushing went much further than any of his contemporaries in deducing pre-operatively the probable nature of the tumour from a consideration of the history, of the signs, and of the laboratory tests. His major contribution was something bigger than a study of cell structure. His system of following up his patients, of keeping in constant touch with them, of making them feel that here was a friend as well as a surgeon, enabled him to acquire a remarkable grasp of the natural histories of the tumours themselves, of their duration, and of the expectation of life with different types. His last great book on the meningiomas shows very well what could come out of a systematized clinic. He had planned to write this book with George Heuer when he was at Baltimore, on the basis of twelve cases, and he always said that it would have been a much better and more readable book than the one that finally appeared, which was based on over 300. When one tries to assess the most important contribution made by Harvey Cushing I think that one must give pride of place to the purely humanitarian fact that he had a lower mortality than anyone else, either before him or contemporaneously. His mortality indeed appeared so fantastically low to some that they openly refused to credit it. There can be no doubt whatever that it was strictly accurate. What perhaps made it more difficult still for the average man to understand was that he spent more hours over a single case than the general surgeon spent upon half a dozen. All the Baltimore School were slow operators, but in neurosurgery there was the more reason for it because there was everything to learn, and because impatience might well lead to disaster. Others did not see that this was the cause of his success and that the Halstedian principles upon which he had been brought up were the foundation of everything.

Many of the great pioneers have been great individualists; it falls to few to found a school. Horsley and Macewen are examples of this lapse in our own country. Cushing attracted people to his clinic from all over the world; they made themselves his pupils, his disciples, and his friends. He had the same nebula of excitement as T. E. Lawrence; few can ever have had such a stimulating personality. The process of stimulation could be somewhat painful to the co-worker, who left "The Chief" to play his part elsewhere fired with an ability which he would never otherwise have developed, yet somewhat ruefully licking his wounds. Few people could be more devastatingly charming than he, few were more ruthless in their onward drive. But if he drove others, he also drove himself. There was a strong streak of tenderness in his personality that drew one irresistibly to him, a trait very readily recognized by his patients. He was strangely incurious about other people, and though he liked to hear about them he never gossiped. There is no doubt that he was a great artist, there was something electric about him, a stimulus to be got obtainable nowhere else; the sick instantly felt confident in him. His ideal was of the highest: the arduous and ascetic advancement of learning. Considerations of money never entered into his calculations, and although he had a sufficiently lucrative practice he disparaged fees out of proportion to the service rendered. Though often in great discomfort, it was characteristic of him that he never mentioned his own ailments and even actively discouraged discussion of them—an unusual human trait. In his later years, when he alternated between a wheeled chair and the most incongruous bursts of activity, he still retained all his old fire. His entrance to a room could be relied upon to have the same effect: that sudden heightening of interest, that anticipation which was so rarely disappointed as that unex-

pectedly deep voice was heard and as those lean fingers intertwined. Harvey Cushing was truly one of the great figures in medicine of all time. He has set a standard of performance which we shall not forget, even though we cannot equal it.

J. D. COMRIE

Dr Harley Williams sends the following appreciation:

The late John Dixon Comrie will be remembered by generations of Edinburgh students for his lectures on the history of medicine. This course was not compulsory for the degree, but the minority who were curious enough to attend the first meeting all became Comrie's adherents. A tall, stooping figure, he would slink into the room wearing the old-fashioned high collar above which a face with exceedingly black eyes and moustache scanned the small but faithful band. He would show one slide after another by a small lantern on the bench before him. Bending over in the light of the carbon arc, his huge shadow thrown up behind, Comrie resembled a humorous Mephistopheles, and he described the wonders of medical history in an unscholastic but very interesting way. It was not mere knowledge out of a textbook; his information, like his pictures, had been gathered over years, and his slides were a miscellaneous collection of portraits, maps, manuscripts, and famous scenes. He would expound them with an air of modest enthusiasm as if he shared the astonishment of his audience. Ever since those lectures my notions of Hippocrates (with a photograph of the island of Cos), of Avicenna, and Vesalius (shown in his great lecture theatre), the martyrdom of Servetus, and the circulation of the blood (with illustrations from Harvey's writings) are founded on Comrie's penetrating descriptions. He knew exactly the way to make vivid the distant situation, and with a conjurer's art he could produce exactly the picture needed to complete his effect. His students owe to Comrie their insight into the tremendous background of medicine. He was born in Buchan, that north-east shoulder of Scotland above Aberdeen. Perhaps from that stern coast came his laborious persistence in acquiring materials for his writings on medical history. He was too absorbed in such things and had too logical a mind to develop the large practice which his skill justified. But he was not a mere collector of relics and memorials, for he could make the design to fit them. He rescued names from oblivion, and his own will be remembered, as he had the gift of fixing for the benefit of the future many otherwise forgotten aspects of the changing face of medicine.

We regret to announce the death on September 24 of Dr. Charles J. J. Harris of Moresby Hall, Whitehaven. Educated at the Royal Naval College and Charing Cross Hospital, he took the L.S.A. in 1883, the English conjoint diplomas in 1897, and the M.D. of Durham in 1901. As a young man he became house-surgeon to the Whitehaven Hospital, and after three years began general practice but retained his connexion with the hospital, and at the time of his death was an honorary consulting surgeon, a member of the general committee, and a life governor. Dr. Harris was a strong exponent of the outdoor life and was associated with the Boy Scout movement for more than twenty-five years, becoming County Commissioner for Cumberland, and received the long service medal. During the war he served with the Border Regiment and later with the Artillery Brigade, rising to the rank of major. Whitehaven miners, for whom he worked for so many years, owed him a deep debt of gratitude. During the Wellington pit disaster in 1910 he risked his life in penetrating into the distant workings with the rescue parties, and for this he was awarded the King Edward Medal. Dr. Harris took a keen interest in the municipal health service, in the work of the St. John Ambulance Association, and of the British Legion. He was a member of the Cumberland and Westmorland Antiquarian and Archaeological Society and joined the British Medical Association as long ago as 1887. Full military honours were accorded at the funeral at Moresby Parish Church on September 27.

Dr. Augustus Mayberry Whitestone, who died on October 7 at Hollingbourne, near Maidstone, had practised there from 1894 until his retirement some years ago. Born in Dublin on October 29, 1856, the son of Berkeley Whitestone, he was educated at Armagh Royal School and Trinity College, Dublin, graduating B.A., M.B., B.Ch., and taking the L.M. of the Rotunda Hospital in 1883. He was for three years assistant surgeon to the County Down Infirmary, and after settling in Kent at Hollingbourne became medical officer to the local workhouse and the hospital for infectious diseases, and public vaccinator. In his student days Dr. Whitestone was a leading rugby football player, representing Dublin University and Ireland. He had been a member of the British Medical Association for fifty-six years.

Universities and Colleges

UNIVERSITY OF OXFORD

In Convocation on October 12 the Vice-Chancellor, Mr. G. S. Gordon, President of Magdalen, made his annual speech, dwelling particularly on the influence of war, and the prospect of war, upon university life. With regard to the Faculty of Medicine he said that the decision to evacuate London had thrown on the University of Oxford "the obligation of providing our medical students with clinical training, a new and formidable experiment which the Regius Professor and his colleagues are tackling in great style. And it has filled, or is filling, more than half our colleges with Government officials."

UNIVERSITY OF CAMBRIDGE

Medical Students under War Conditions

With a view to expediting the qualification of medical students who have resided for six terms, and are so well advanced in their studies as to be ready for the clinical instruction which is normally received elsewhere and cannot be provided within the University, the Council of the Senate has resolved that medical students who have completed two years of residence and have qualified in anatomy and physiology be allowed to count residence while attending approved courses of clinical instruction away from Cambridge. For the benefit of students who wish to expedite those parts of their medical training which are done within the University, the General Board recommends that candidates for the Final M.B. Examination be not required to have obtained honours in a Tripos or, being over the standing for honours, to have attained the honours standard in the Natural Sciences Tripos; and a Grace putting into abeyance for the present Regulation 8 (*d*) for the degrees of M.B., B.Chir. is to be submitted to the Regent House.

Retiring Vice-Chancellor's Address

At a Congregation held on October 2 Professor H. R. Dean, M.D., Master of Trinity Hall, resigned the office of Vice-Chancellor and made an address to the Senate on outstanding events in the past academical year. Among the deaths of resident members of the University he mentioned Dr. Charles Cyril Okell, whose contributions to bacteriology had added much to knowledge of the origin, detection, and prevention of bacterial diseases. The Vice-Chancellor said that the new Anatomy Laboratory was finished just before the beginning of the Michaelmas Term and had been in use throughout the year. Speaking of recent events he said: "In sharp contrast to the confusion and uncertainty which marked the crisis of September, 1938, the outbreak of war found members of the University prepared and ready to undertake unaccustomed duties. Many members of the University staff have already left Cambridge to hold commissions in the fighting forces or posts in the Civil Service. Those who remain in the University have cheerfully shouldered some extra burden of labour or responsibility. Our country possesses in the undergraduates and younger graduates of the Universities a supply of young men admirably equipped to take a leading part either as officers of the fighting services or in the study of the scientific and technical problems on the solution of which success in modern warfare depends. In the difficult times which lie before us young men trained in Cambridge laboratories are well fitted both to advance and to employ scientific knowledge for the maintenance and improvement of national defence. . . . During the earlier months of the year and during these last few weeks the Cambridge Colleges have met most will-

ingly the requests made to them on behalf of the Government or by the Colleges of the University of London which sought their hospitality. . . . Within a few days of the outbreak of war the students from the London Hospital and from St. Bartholomew's began to work in Cambridge. They have been joined by our own students, and the laboratories of the Medical School have presented for some weeks a scene alive with all the many activities of Full Term. But the teaching work of the University will not be confined to the laboratories, for, as a result of the Government's decision to defer the obligation of military service for men below the age of twenty years, the Colleges expect a large number of Freshmen. Undergraduates whose services will not be needed by the Government in the immediate future will begin or continue their studies at the University, with the knowledge that by their work at Cambridge they will make their best contribution to the welfare of this country."

The following candidates have been approved at the examination indicated:

DIPLOMA IN MEDICAL RADIOLOGY AND ELECTROLOGY.—*Part II:* E. H. Allen, R. B. Boal, A. H. Brockbank, O. C. Levine, H. M. Marks, M. P. G. O'Brien, S. R. Reynolds, K. V. Shetty.

UNIVERSITY OF MANCHESTER

Dr. D. D. Cranna has been appointed Assistant Lecturer in Anatomy.

The following candidates have been approved at the examination indicated:

DIPLOMA IN PUBLIC HEALTH.—*Part 2:* H. S. Bagshaw, Jessie R. Davidson, H. N. Osborne, F. Stratton, H. Williamson. *Part 1:* Mary A. Rogerson.

UNIVERSITY OF SHEFFIELD

Mr. C. D. P. Jones, F.R.C.S., has been appointed honorary demonstrator in anatomy.

The Services

CHEMOTHERAPEUTIC AGENTS FOR SEPTIC WOUNDS

PROPHYLAXIS AND TREATMENT

The following memorandum concerning the use of sulphonamide derivatives for prophylaxis and treatment of wound infections is being distributed from the War Office to all officers of the Royal Army Medical Corps. It is emphasized that the memorandum is provisional.

War Office Memorandum

Preamble.—Experimental and clinical results having proved the effectiveness of sulphonamide derivatives in the treatment of streptococcal infections and having indicated that these compounds have also an action on anaerobic gas forming bacilli it is recommended that these compounds be given a trial in the field. In principle the earlier the drug is administered the more effective is the result, but some benefit may be anticipated even in well-established infections.

For the time being it is recommended that all wounds which from the clinical aspect appear likely to become the site of secondary coecal or gas gangrene infection should receive a prophylactic course of sulphonamide treatment at the *earliest possible opportunity* and that this prophylactic course should be extended if definite infection supervenes.

Designation of Sulphonamide Compounds in common use.—(1) Sulphanilamide (synonyms: sulphonamide-P, colsulanyde; streptocide, prontosil album). (2) M & B 693 (synonyms: sulphapyridine, dagenan). (3) M & B 693 soluble (synonym: dagenan sodium).

Administration

(*a*) GENERAL PRINCIPLES

(1) A prophylactic course should occupy about 48 hours.

(2) Courses of treatment for established or developing infections should extend over ten days, but if not effective by this time an interval of 48 hours should be allowed before continuing treatment.

(3) When an infection appears to be controlled, as judged by the temperature, small doses should be continued for a further 3–5 days in order to prevent relapses.

(4) The principle of effective treatment is to obtain a high blood concentration of the drug as rapidly as possible and to maintain this concentration at an effective level over a period of time. Because the drugs are rapidly excreted it is necessary, in order to maintain an effective level, to administer four hourly *night and day*.

(*b*) PRECAUTIONS

Certain individuals are unduly sensitive to the drugs and there is no evidence yet available for assessment as to whether persons suffering from shock may not be even more sensitive. The reactions that may occur can be classified as (1) *Mild*, (2) *Serious*. The following is a list of such reactions together with comments as to how they are best avoided or treated.

(1) *Mild*:

Nature of Reaction	Remarks
Cyanosis:	Incidence reduced by prohibiting sulphur containing foods and especially by the avoidance of saline purges and drastic purges. Liquid paraffin the best laxative. Cyanosis may be temporarily dispersed by giving 0.5 to 1.0 g. per day of methylene blue by the mouth. Cyanosis *per se* should not prohibit continuance of treatment.
Acidosis:	Treat by oral administration of sodium bicarbonate.
Drug fever:	Requires to be distinguished from fever due to recrudescence of infection. If true drug fever, omit drug.
Dermatitis:	Omit drug and induce diuresis with water or simple diuretic. May be the prelude of more serious complications. Check leucocyte count if possible.
Dizziness, headache:	If intolerable, administer fluids freely. Check leucocyte count if severe.
Leucopenia:	Negligible unless rapidly progressive to below 3,000 leucocytes per cmm.
Haematuria (MB 693 only):	Administer fluids freely.
Jaundice } Neuritis }:	Omit drug. Induce diuresis. (*See* also haemolytic anaemia.)

(2) *Serious*:

Agranulocytosis:	Occurs after 10 days or more of treatment. Incidence rare. Leucocyte count only method of diagnosis. Other symptoms: headache, deterioration of condition, fever, sore throat. Treat by transfusion and pentnucleotide.
Haemolytic Anaemia:	Occurs early (2–4 days). Incidence rare. Mortality low. Early signs jaundice and haemoglobinuria. Omit drug, induce diuresis, transfuse if necessary.

(*c*) DOSAGE

(1) *Sulphanilamide.*—Tablets should be powdered and administered suspended in milk or water.

Prophylaxis.—4 g. (8 tablets) statim followed by 2 g. (4 tablets) in four hours' time followed by 1 g. (2 tablets) four hourly night and day for a period of 48 hours. If infection develops continue as for "treatment."

Treatment.—4 g. (8 tablets) statim followed by 2 g. (4 tablets) in four hours followed by 1 g. four hourly night and day for a maximum period of ten days. If infection is still uncontrolled allow an interval of 48 hours and then repeat the same course from the beginning or, if available, change on to M & B 693. If infection appears to be controlled during the first or

later courses reduce dose to 0.5 g. (1 tablet) four hourly and continue for 3-5 days after the temperature has become normal.

Note.—During the first course of treatment if no clinical effect is evident within three days it is recommended that a change be made to M & B 693. But if some clinical effect is obvious it is worth while pursuing the full course of sulphanilamide.

(2) *M & B* 693.—Tablets should be powdered and administered in milk or water. If vomiting is troublesome split the doses and give at shorter intervals, *e.g.*, instead of administering 1 g. four hourly give 0.5 g. two hourly.

Prophylaxis.—3 g. (6 tablets) statim, followed by 2 g. (4 tablets) in four hours' time followed by 1 g. (2 tablets) four hourly night and day for a period of 48 hours. If infection develops continue as for treatment.

Treatment.—The same procedure as for sulphanilamide except that the initial dose is 3 g. (6 tablets) instead of 4 g.

(3) *M & B* 693 *Soluble.*—This substance is of great value when swallowing is impossible or when gastric upset prevents absorption of the oral compound. It consists of a 33 per cent. solution (1 g. in 3 c.c.). Injections are best made intramuscularly, but as the solution is alkaline some reaction at the site of the needle puncture is common unless care is taken to inject deeply and avoid escape into the subcutaneous tissues. The solution may also be injected intravenously if the dose is diluted with 20 c.cm. of sterile distilled water or normal saline. The drug may also be added in suitable quantity to intravenous drop transfusions of saline or blood (at the rate of 1 g. per four hours).

Dosage Prophylactic and Treatment.—1 g. (1 ampoule) four hourly night and day, the prophylactic course being completed in 48 hours. The treatment course may be continued for ten days, but it is strongly recommended that a change over to the oral compound be effected at the earliest opportunity. The soluble compound finds its best use in the initial phases of a course of treatment and should not be regarded as a substitute for the oral compound; it should only be used for a continuous course when oral therapy is impracticable.

HONORARY PHYSICIAN TO THE KING

Colonel F. Whalley, D.S.O., T.D., T.A., has been appointed Honorary Physician to the King as from July 7, in succession to Colonel H. T. Bates, O.B.E., T.D., T.A., who has retired.

DEATHS IN THE SERVICES

Surgeon Captain Reginald Thomas Alexander Levinge, R.N. (ret.), died recently at Bournemouth. He was educated at Trinity College, Dublin, where he graduated A.B. in 1882, and in the school of the Irish College of Surgeons, and took the L.R.C.S.I. in 1885 and the L.R.C.P.I. in 1886. He entered the Royal Navy soon afterwards, attained the rank of fleet surgeon on February 22, 1904, and became surgeon captain on October 3, 1908. As surgeon of H.M.S. *Alecto* he served in the punitive naval expedition commanded by Rear-Admiral Rawson in 1897, and landed with the force sent to punish the King of Benin for the murder of the members of a political party, and took part in the capture of Benin City on February 18, 1897. When Lieutenant-Commander Pritchard was shot Surgeon Levinge took command of the party and led it with success. He was mentioned in dispatches and received the General Africa Service Medal, with Benin clasp.

Lieutenant-Colonel James Burne Lapsley, M.C., I.M.S. (ret.), died at Mont Cantel, Jersey, on October 7, aged 55. He was born on August 16, 1884, was educated at Queen's College, Cork, and graduated M.B., Ch.B., B.A.O. of the Royal University of Ireland in 1907. He entered the Indian Medical Service as lieutenant on February 1, 1908, became lieutenant-colonel after twenty years' service, and retired on April 20, 1935. He served throughout the war of 1914–18, and received the Croix de Guerre on August 31, 1917, and the Military Cross on June 3, 1918. He was appointed assistant director-general (stores), Indian Medical Service, on November 27, 1926, vice Lieutenant-Colonel G. G. Hirst. He had been a member of the British Medical Association since 1912.

Medical News

The Society for the Protection of Science and Learning has changed its address from 6, Gordon Square, London, W.C., to Scott Polar Research Institute, Lensfield Road, Cambridge.

Until further notice *La Presse Médicale* will appear once a week instead of twice weekly as hitherto.

The congress of the Italian Society of Plastic Surgery, which was to have been held at Naples on October 21 and 22, has been cancelled.

The Library of the British Medical Association will be open from 9.0 a.m. to 5.0 p.m. (1.0 p.m. Saturday) until further notice.

By arrangement with the Ministry of Health the out-patient department of the Golden Square Throat, Nose and Ear Hospital has now been reopened.

The Child Guidance Council has changed its address to 23, Queen Square, Bath (telephone: Bath 2390).

Owing to the war the council of the Zoological Society of London has decided for the present to discontinue its fortnightly scientific meetings.

The Ministry of Health in a communiqué dated October 13 announced a visit by the Queen to a casualty evacuation train. Her Majesty was received by the Minister of Health, Dr. Walter Elliot, Captain Euan Wallace, Minister of Transport, and the official party also included Sir George Chrystal, Secretary of the Ministry of Health, Dr. J. H. Hebb, Director-General of the Emergency Medical Service, and Miss K. C. Watt, Principal Matron for Emergency Nursing Services. The primary purpose of these trains is to evacuate air raid casualties from the advanced base hospitals in vulnerable areas to the base hospitals in outer areas. A train crew consists of one medical officer, one hospital train officer, three trained nurses, ten auxiliary nurses, and eight St. John Ambulance Brigade orderlies. Nursing staff is supplied by the Civil Nursing Reserve, and about 400 nurses are employed on the trains. A description of a casualty evacuation train is published in this week's *Supplement* at page 208.

It is announced in the *Times* that eighteen Egyptian medical men resident in England have, through the Egyptian Ambassador in London, offered their services to the British Government wherever they can be useful in the present circumstances. The Secretary of State for Foreign Affairs has expressed to the Egyptian Ambassador the Government's high appreciation of these generous offers.

On October 13 two claims against the Corporation of Croydon in respect of the death of two schoolboys in the Croydon typhoid epidemic were disposed of in the King's Bench Division by Mr. Justice Stable on payment of agreed damages aggregating £1 638.

Dr. J. Trueta, late director of the department of surgery, General Hospital of Catalunya, Barcelona, will read a paper on "The Organization and Treatment of War Casualties" before the Section of Orthopaedics of the Royal Society of Medicine (1, Wimpole Street, W.) on Tuesday, October 24, at 2 p.m. Members of the Sections of Anaesthetics, Medicine, Surgery, and United Services are invited to attend.

Dr. Richard W. B. Ellis, assistant physician to the Children's Department of Guy's Hospital, and joint editor of the *Archives of Disease in Childhood*, left London on October 12 for Rumania as one of a delegation of three from the Friends' Service Council to inquire into the possibilities of relief work among Polish refugees. The delegation are taking with them a grant from the Anglo-Polish Relief Fund for immediate use in necessitous cases.

Medical Notes in Parliament

The House of Commons this week made progress with a Bill to suspend local elections and the registration of electors. The Prices of Goods Bill was down for second reading. Debate arose on the adequacy of the allowances for the families and dependants of soldiers and on war pensions. Statements were made in both Houses on the progress of the war and on air attacks against Great Britain.

At a meeting of the Parliamentary Medical Committee on October 13, Sir Francis Fremantle in the chair, a report was received of the visits paid by Sir Francis and Dr. Haden Guest to first-aid posts and on suggestions made to the Ministry of Health. Sir Francis Fremantle also reported on his interview with the chairman of a local regional committee and a consultant specialist about the defective organization of a public assistance institution as a civil emergency hospital owing to lack of co-operation between the local authorities concerned. The Parliamentary Medical Committee discussed the petrol ration to medical men, on which Sir Francis Fremantle had introduced a deputation of the British Medical Association to the Minister of Mines. Other subjects considered by the Committee included the disabilities of consultants in the civil emergency scheme; the under-employment of medical officers in hospitals, civil and military, at present empty; the medical care of dispersed military units in the United Kingdom, and the departure from the United Kingdom of military units without vaccination or inoculation. The Committee decided not to take action on the allocation of war wounded between military and civil hospitals. It agreed to represent to Sir Kingsley Wood the desirability of appointing women medical officers for service with women's establishments attached to the Royal Air Force.

There has been presented to Parliament the report of Lord Weir's conference on war damage to property. This conference has failed to find or devise any practicable or justifiable scheme for mutual protection against the risk of war damage to fixed property in private ownership. A promise of State assistance is renewed.

Commandeered Hotels at Spas

In the House of Lords on October 11 Lord Greville adduced complaints against the commandeering by the Government of hotels at British spas. He said many thousands of sufferers from rheumatism, including miners, sought treatment each year at these spas. In war time the number of these people was likely to be increased. In consequence of exposure on military service there would arise, as the last war showed, many cases of rheumatism, neuritis, arthritis, and kindred elements. He asked whether any competent medical authority had been consulted when hotels at spas were commandeered. He understood the Ministry of Health occupied itself in commandeering accommodation for lodgings. Were the medical men who lived in these spas consulted? In some places practically no accommodation was left.

Earl Stanhope regretted that inconvenience had been caused to individuals. The Government had to take precautions to ensure the functioning of the Departments dealing with the social services such as national health insurance, and to see that alternative accommodation was available in the event of air attack. Large buildings had to be found, and few provincial towns save spas and holiday resorts afforded accommodation suitable for offices. Three spas had been reserved for those who might suffer from rheumatism as a result of service with the Forces. That had been considered by a committee representing the Ministry of Health and the Service Departments. There was not actually a doctor on that committee. He was advised that accommodation would also be available for the public who required treatment, though not such good accommodation. Facilities at most hydropathics were still available for the general public.

Army Medical Services in France

Mr. Hore-Belisha announced on October 11 that 158,000 men had been transported to France within five weeks of the outbreak of war. Sir Francis Fremantle asked whether full provision had been made for the health of the troops on the medical and sanitary sides. Mr. Hore-Belisha replied that the Director-General of the Army Medical Services was acknowledged by the medical profession to be a man of the highest reputation. Civilian doctors were satisfied on the whole with the skill and powers of organization of the R.A.M.C. The medical profession had a free hand to do everything which was of advantage. He would willingly hear suggestions from Sir Francis Fremantle.

Hospital Treatment of London's Civilian Population

Dr. Elliot told Sir Ralph Glyn on October 12 that there were normally approximately 97,000 hospital beds in the metropolitan police area, excluding beds for mental patients. Under the Emergency Hospital Scheme an additional 14,000 beds had been set up in hospitals in the outer parts of the area. Approximately 13,000 beds had, for the time being, been closed in certain of the inner hospitals. Beds now available in the metropolitan police area numbered 98,000. Approximately 55,000 were immediately available in hospitals in the area of the London Sector Scheme (which was rather larger than that of the metropolitan police area). These could be used either for casualties or for ordinary sick in need of in-patient treatment. Hospitals had been instructed to admit to their unoccupied beds all cases requiring in-patient treatment.

Dr. Elliot further told Sir Ralph Glyn that many of the beds in the general hospitals were available for children, and although figures did not distinguish children's beds from adults' beds, he understood that in general there were beds for all requiring hospital treatment. The ordinary hospital services remained available. There should, therefore, not be difficulty in obtaining specialist treatment for children who remained in London.

Mr. Parker asserted on October 11 that out-patients from London hospitals, who had been told to attend their local hospitals during the war, had now been told to go to a local doctor. Miss Horsburgh answered that no instruction had been given under the Emergency Hospital Scheme that persons who normally attended at hospitals for out-patient treatment should go to a local doctor instead. At the beginning of the war some London hospitals temporarily closed their out-patient departments of their own volition, but most of these had now been reopened.

House Officers and the E.M.S.

Mr. Parker asked on October 12 whether the sector officers in charge of the Emergency Medical Service in various districts were consulted before the dispatch of the letter of dismissal from the Service sent out by his Department on October 6 to a large number of doctors. Dr. Elliot answered that the letter was sent out in error. All Group Officers had now been advised as to the actual position of the doctors in question. The Ministry of Health would fulfil obligations incurred during the past five weeks to the doctors.

Release of Doctors from E.M.S.

Dr. Elliot stated in reply to Sir Ralph Glyn that as regards the release of members of the medical profession to carry on their normal duties, arrangements had been made whereby doctors could either go on indefinite leave, subject to recall if required, or (with the exception of doctors filling posts as registrars, house-physicians, and house-surgeons) go on part-time service under conditions recently drawn up in accordance with the advice of a committee. That committee was as follows: Sir Bernard Docker (chairman), Dr. G. C. Ander-

son, Sir Girling Ball, Dr. H. E. A. Boldero, Lord Dawson, Mr. C. H. S. Frankau, Sir Cuthbert Wallace, and Sir Charles Wilson. The conditions referred to were:

1. Each officer who was transferred to part-time would make his services available to the State, if required, for the equivalent of four days in every week, the remainder of the time being at his own disposal. The precise manner of giving effect to this condition—that is, the particular days or parts of days when the officer was to be on call—would be a matter for arrangement with the medical superintendent, subject to the approval of the Group Officer. A record of the times when the officer attended for duty would be kept by the medical superintendent.

2. He would receive a retaining fee equivalent to one-third of the salary which had been already offered to him. This fee would cover any services rendered under the previous paragraph so long as he remained on a part-time basis.

3. Should circumstances make it necessary he would be required to resume whole-time, in accordance with the undertaking he had given, and in that event payment of the full salary would be resumed.

4. No officer who elected to go on part-time would be eligible for an allowance for board and lodging or for travelling between his home and his official headquarters.

5. Similarly, such officers, being no longer whole-time temporary civil servants, would not be entitled to official leave or to sick pay during temporary absences due to illness.

Emergency Hospital Scheme: Payments to Hospitals

In a reply to General Sir Ernest Makins on October 12 Dr. ELLIOT said payments in respect of beds reserved for air raid casualties were at present being made only to voluntary hospitals. They were made fortnightly. The total payments so far made for the first fortnight amounted to approximately £170,000. This figure would be subject to considerable adjustment in the light of additional information from the hospitals following the payments. This system enabled the country to have many beds ready and staffed for casualties which would not otherwise be available. He did not consider the provision being made against air raid casualties unreasonable. He was reviewing the list of hospitals where beds were reserved in order to ensure that beds were not being kept empty unnecessarily. Payments to the hospitals were not related to the payments normally made by civil patients, since these did not as a rule meet the whole cost of treatment. Voluntary hospitals were largely dependent on contributions and other charitable sources for the treatment of civil patients, but the Government had undertaken that the cost of treating casualties should be borne by the Exchequer. The Ministry of Health was investigating the claims submitted by hospitals to ensure that they properly corresponded with the actual additional expenditure in which the hospitals were involved by reason of the Emergency Hospital Scheme.

Income of Hospital Medical Staffs

Sir ERNEST GRAHAM-LITTLE asked on October 12 whether Dr. Elliot knew that, as the result of his action in enrolling for full-time service nearly all the medical staffs of the voluntary hospitals in London at salaries which in most cases would hardly defray their house rent, rates, and taxes, he had subjected a large number of the most distinguished members of the medical profession to acute financial stress, inasmuch as they had been suddenly prevented from earning any income from private practice, but were unable to relinquish as suddenly their heavy commitments based on their previous earnings. Sir Ernest suggested some legislative provision such as a moratorium in the payment of rent, rates, and taxes in the case of consultants thus called up for national service. Dr. ELLIOT in reply said recruitment to the Emergency Medical Service was on a voluntary basis. Salaries and conditions for this service were fixed in consultation with representatives of the medical profession. He referred Sir Ernest to the arrangements under which doctors serving in the Emergency Medical Service could go on indefinite leave, subject to recall if required, or, with certain exceptions, transfer from full-time to part-time service. These arrangements should enable the practitioners to whom Sir Ernest referred to continue private practice. Dr. Elliot added that he could not accept the suggestion of a legislative moratorium.

Hutment Hospitals

Dr. ELLIOT informed Mr. Gallacher on October 12 that in England and Wales 104 hutment hospital schemes, of 1,037 huts, comprising 38,120 beds, had been decided upon. In seventy-one of these schemes the estimate of cost submitted by a local architect had been approved and construction of the huts begun. Two of the schemes, comprising twenty-three huts, had been completed, and in several more the roofing and walling had been finished. Medical, nursing, and other personnel would be allotted to the hutment hospitals as they were completed, but he could not give the numbers. As the huts are not in use he could not express any opinion on their functioning, but had reason to trust it would be satisfactory.

Blood Transfusion Organization

Mr. CULVERWELL asked Dr. Elliot on October 12 whether the blood transfusion organization for the London and Home Counties district still took regular donations of blood from registered blood donors; and, since military requirements were provided for by a separate organization which was a special branch of the Royal Army Medical Corps, what was done with this blood given by citizens. Dr. ELLIOT replied that the blood transfusion organization for London and the Home Counties was set up to ensure a ready supply of blood. As blood could only be stored for a limited time, supplies were being continually taken from blood donors. Arrangements had been made with the Defence Services that the stores of blood would be used to supply Service requirements subject to civilian demands being satisfied. Blood which was taken and not used for its primary purpose was utilized for the preparation of serum, a stock of which was invaluable under war conditions.

Answering Mr. David Adams on the same date, Dr. ELLIOT said the chief measure taken for the increase in the supply of blood for transfusion purposes was the setting up of depots on the outskirts of the London region where a store was now always maintained. These depots had been set up by the Medical Research Council and were fully in operation. They would supply blood to the London region and to some districts outside. In the provinces the existing voluntary arrangements had been augmented.

E.M.S. and Voluntary Hospitals

On October 17 Mr. ROSTRON DUCKWORTH asked the Minister of Health whether he was aware of the view held by medical men that there was much unnecessary confusion in the relations of the emergency medical service and voluntary hospitals, and what steps he was taking to ensure smoother working and general satisfaction among those directly concerned. Dr. ELLIOT replied that some initial difficulties were to be expected in putting any large-scale organization on a war footing. His officers were in constant touch with representatives both of the medical profession and of the voluntary hospitals, and necessary adjustments were being made as rapidly as possible in the light of experience gained.

Sanitary Inspectors and the R.A.M.C.

Major MILNER asked the Secretary of State for War on October 17 whether his attention had been drawn to the dissatisfaction of sanitary inspectors at being debarred from receiving commissioned rank in the hygiene companies of the Royal Army Medical Corps, and if, in view of their qualifications and experience in sanitary administration, commissions in the above companies would in future be made available to sanitary inspectors of suitable merit. Mr. HORE-BELISHA replied that as officers of Field Hygiene Sections were called in to advise on all matters affecting the health of the troops, it was essential that these appointments should be held by specially qualified medical men so long as these were available. Major MILNER asked if Mr. Hore-Belisha was not

aware that these men had high special qualifications, and if he would not reconsider the matter in view of the fact that commissions in the past had been granted to other than medical men. Mr. HORE-BELISHA said he desired to give the troops the most qualified service procurable, and for that reason commissions in the Royal Army Medical Corps were reserved for doctors. Naturally, one considered any proposals which might be made, but at the moment he could not accede to them.

Vaccination and Inoculation of Oversea Forces

On October 17 Sir FRANCIS FREMANTLE asked the Secretary of State for War if units going over-seas had been vaccinated against small-pox and inoculated against enteric fever; and if units that might be sent oversea were being so vaccinated and inoculated in readiness for over-seas service. Mr. HORE-BELISHA said that the answer to both parts of the question was, "Yes, subject to the consent of each individual." Sir FRANCIS FREMANTLE then asked if Mr. Hore-Belisha was aware that at least one unit of which he knew, and was under orders to go over-seas, was not inoculated or vaccinated. Mr. HORE-BELISHA said that if Sir Francis Fremantle would draw his attention to the unit he would investigate the matter.

Medical Attention of Scattered Defence Units.—Sir FRANCIS FREMANTLE asked on October 11 whether the War Office could arrange for the medical care of anti-aircraft searchlight men and other scattered units to be undertaken by local civil practitioners and release for other duties medical officers on the established strength who were unable to cover the ground. Sir VICTOR WARRENDER replied that the military medical establishments of these units must be maintained. Civilian medical practitioners were employed in cases which regimental medical officers were unable to attend. The ordinary arrangements were then made.

Newcastle's Milk Supply.—Mr. DAVID ADAMS asked on October 12 whether during the last two months both milk supplied under the Milk (Special Designations) Order, 1936, and undesignated milk had shown a serious deterioration when tested for tubercle bacilli by Newcastle corporation. Dr. ELLIOT replied that figures had been sent him by the corporation of Newcastle-upon-Tyne, but were not understood to relate to the presence of tubercle in the milk. He would make further inquiries of the corporation.

Doctors and A.R.P. Work.—Sir RICHARD ACLAND asked Dr. Elliot on October 12 to make every effort to reinstate doctors who gave up salaried posts for air raid precautions work under the impression they would be paid £550 a year and now found they were paid £21 a year. Dr. ELLIOT said he was not aware of any case, but if given particulars he would investigate the matter.

Disability Pensions.—On October 17 Mr. PRITT asked the Minister of Pensions whether he would arrange that every soldier proceeding on active service should be furnished with a document setting out in simple language his rights to receive a disability pension in the event of his being wounded or injured, or falling sick. Sir WALTER WOMERSLEY said he understood that the Royal Warrant in its complete form was to be issued with Army Orders. Article 5 of the Royal Warrant would be construed in a liberal spirit in the light of the expert guidance which would be given by medical officers of very great experience, and would ensure that no material evidence in support of a claim was excluded from consideration.

Medical Students in the Army.—Arrangements have been made for the release from the Army of medical and certain other specialist students provided that they have reached a sufficiently advanced point in their studies. The case of students between 18 and 19 years of age will be considered.

Discharge of Mental Hospital Patients.—The number of persons who were discharged to their homes from mental hospitals under the Emergency Hospital Scheme does not exceed 200. No patient was discharged unless selected after careful investigation of all relevant circumstances, including his home conditions, as suitable to be cared for and supervised by his relatives at home. The Board of Control is reviewing the arrangements for the care and supervision in war time of individuals living in the community who are suffering from mental disorder.

Notes in Brief

In the first nine months of this year 527 persons were killed by accidents at mines under the Coal Mines Act and 2,221 seriously injured.

EPIDEMIOLOGICAL NOTES

Infectious Diseases during the Week

Small increases in the incidence of scarlet fever, diphtheria, and pneumonia (primary and influenzal) have been recorded; although the total incidence of these diseases was much lower than in the corresponding week last year, the rate of increase of all three diseases was comparable in the two years. It is too early to say whether the observed increases are entirely attributable to seasonal influences or are in part due to the re-evacuation of a number of susceptibles back to the large centres of population. Probably little effect in this direction need be anticipated until the schools are reopened generally. It is sufficient to note at this stage that despite the abnormal environmental circumstances of the evacuees and the inevitable disorganization of medical and nursing services, there have been no serious outbreaks of infectious diseases in the reception areas, although the presence of diphtheria carriers gave rise to anxiety in some of them.

Typhoid Fever in 1939

In Europe and the United States of America the situation as regards typhoid fever has remained satisfactory during the first eight months of 1939. Morbidity in most of the countries was about the same as in the corresponding period of 1938 and much lower than in 1937. In the Scandinavian countries and in England the figures were appreciably lower than in 1938. In this country, despite a rise from 96 to 267 during the four-week period ended September 9, notifications have remained well below the median value for the corresponding weeks of the eleven years 1927–37. In France and Germany the total incidence was below the median values, but in Poland the median was exceeded during the two four-week periods ended August 12.

There was little change in the general mortality rates, as in the morbidity rates, in Europe in 1938 compared with the preceding year. As in previous years the highest rates were recorded in Portugal 17 (17.9) per 100,000 population, Malta 6.4 (10.3), Rumania 6.2 (8), Hungary 5.9 (10), Czecho-Slovakia 5.2 (6.3), Lithuania 4.9 (5.5), and Bulgaria 4 (5.8). Rates below 4 per 100.000 population were reported in Poland, Yugoslavia, Greece, and Turkey. (Figures in parentheses refer to the preceding year.)

Twinning in Marmosets.—In forty pregnancies in marmosets twins occurred in 87.5 per cent. In seven instances the sexes of the twins were: two pairs male; two pairs female; three pairs heterosexual. These observations confirm the findings of Hill that two blastocysts fuse completely in early presomite stages, with breaking down of the conjoined chorionic wall, and the formation of a common chorion containing two embryonic primordia. Anastomotic connexions between the umbilical and the placental vessels of the two embryos are established very early. Nevertheless, examination of the gonads and external genitalia of opposite-sexed pairs of foetuses reveals no evidence of freemartin effects.—Observations on Twinning in Marmosets. G. B. Wislocki.—*Amer. J. Anat.* May, 1939, **64**, 445.

No. 39

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 30, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for: (a) England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland.

Figures of Births and Deaths, and of Deaths recorded under each infectious disease, are for: (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases; a blank space denotes disease not notifiable or no return available.

Disease	1939 (a)	1939 (b)	1939 (c)	1939 (d)	1939 (e)	1938 (Corresponding Week) (a)	1938 (b)	1938 (c)	1938 (d)	1938 (e)
Cerebrospinal fever	19	2	10	2	—	18	2	7	—	1
Deaths		—	2				1	1		
Diphtheria	904	33	170	34	27	1,209	129	195	55	25
Deaths	16	—	3	—	1	30	3	6	2	—
Dysentery	23	3	27	—	—	27	6	19	—	12
Deaths			—	—	—			—	—	—
Encephalitis lethargica, acute	4	1	1	—	—	2	—	—	1	—
Deaths		—	2				—	3		
Enteric (typhoid and paratyphoid) fever	68	3	6	3	4	41	4	8	8	1
Deaths	2	—	1	—	—	1	—	—	—	—
Erysipelas			62	5	3			55	12	3
Deaths		—	1				—	—		
Infective enteritis or diarrhoea under 2 years	55	8	17	11	5	40	9	8	8	4
Deaths										
Measles	1	—	6	—	8	3	—	13	—	2
Deaths			—		—			—		—
Ophthalmia neonatorum	66	4	15		—	78	5	31		—
Deaths										
Pneumonia, influenzal*	312	12	5	—	6	448	33	5	—	13
Deaths (from influenza)	17	—	2	—	1	16	—	2	1	—
Pneumonia, primary		4	105	7	7		15	160	9	6
Deaths				7					9	
Polio-encephalitis, acute	4	—				—	—			
Deaths		—					—			
Poliomyelitis, acute	43	—	—	—	—	56	3	5	1	—
Deaths		—	—				1	—		
Puerperal fever	—	—	9	2	—	3	3	21	6	1
Deaths		—					2†			
Puerperal pyrexia	162	8	24		1	166	14	28		2
Deaths										
Relapsing fever	—	—			—	—	—			—
Deaths										
Scarlet fever	1,163	37	193	50	79	1,776	155	380	58	77
Deaths	2	—	—	—	—	1	—	—	—	—
Small-pox	—	—	—		—	—	—	—		—
Deaths		—	—	—	—		—	—	—	—
Typhus fever	—	—	—	—	—	—	—	—	—	—
Deaths			—	—	—			—	—	—
Whooping-cough			39		5			94		7
Deaths	9	2	—	—	—	10	1	3	2	1
Deaths (0–1 year)	308	30	55	31	13	290	38	45	38	10
Infant mortality rate (per 1,000 live births)						48	31			
Deaths (excluding stillbirths)	4,078	629	600	157	129	3,919	713	539	177	104
Annual death rate (per 1,000 persons living)			12.1	10.6	11.3	9.6	9.1	11.0	12.0	9.2
Live births	6,263	877	850	384	208	6,521	1,250	807	407	201
Annual rate per 1,000 persons living			17.2	25.8	18.3	16.0	15.9	16.4	27.6	17.8
Stillbirths	235	28	35			275	36			
Rate per 1,000 total births (including stillborn)			40			40	28			

* Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.
† Deaths from puerperal sepsis.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to The EDITOR, British Medical Journal, B.M.A. House, Tavistock Square, W.C.1.

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QUERIES AND ANSWERS

B. coli Infection of Kidney

Dr. C. S. Storrs (Helston, Cornwall) writes: A young married woman, seven months pregnant, had an attack of *B. coli* infection of the kidney in May. She was acutely ill for forty-eight hours with temperature 103°–104.5°, rigors, and pain in left loin. *B. coli* were present in the tissues. She rapidly recovered under proseptasine. The urine was free from *B. coli* in ten days. At the end of September she had another similar attack. She now asks whether anything can be done to prevent recurrence of these attacks. What can I do about it?

Income Tax

Payment for A.R.P. Lectures

"Assistant M.O.H." has received £8 8s. for first-aid lectures given in 1938–9. How should such fees be assessed?

*** If he were in general practice the fees could be regarded as part of his general professional earnings assessable under Schedule D, but as his existing assessment is under Schedule E in respect of a specific appointment the fees in question must be separately assessed. On that basis they have to be regarded as a new source, and the amount received for work in 1938–9 is chargeable to tax for that year.

LETTERS, NOTES, ETC.

The Aggressive Instinct

Mr. Fauset Welsh, F.R.C.S., writes from Birmingham: Without being psychotherapists, quite ordinary persons can see the sound sense in Dr. B. H. Kirman's letter in the *Journal* of September 30 (p. 701). For an adult to give direct expression to normal aggressive instinct is, he says, pathological in a civilized community. Can those, then, who in good faith encourage this instinct be sane? Have we not as a profession the obligation to proclaim the correct psychotherapeutic treatment for the disease whether manifested in individuals or communities? Can we not concentrate on preventing and treating disease rather than on preparing elaborate plans against conditions which the same plans must encourage? Some soldiers dislike being bombed and object. Many more civilians will dislike it still more and object more strongly. It seems a reasonable attitude, and attempts to discourage this dislike by encouraging normal aggressive instinct are either childish, pathological, or uncivilized. Surely the rational principle of treating psychological casualties includes removal of the cause if still operative. If we support or encourage this cause we are betraying our trust, and our treatment will be ineffective or productive of further evil. As we are fighting against moral evil medical men and particularly psychologists should know what sort of weapons are likely to be most effective in both attack and defence.

The Flight from Poland

Tragic stories of the flight from Poland are told in a dispatch just received in London, by way of Budapest, from the administrator of the Save the Children Fund in charge of relief work among child refugees near the Polish-Hungarian frontier. Many of the refugees began their flight in the early days of the war, when they escaped from areas overrun by the German armies into territory then still in Polish hands. Then came the Russian invasion and they were again put to flight. For the most part they had to hide in forests during the day, lying on the ground while bombing from the air was going on. Then, at night, they would continue their journey, ill clad, hungry, and with only the smallest remnants of their possessions that they could carry with them. "The psychological effect on the children is terrible," says the Save the Children Fund administrator, who is a psychologist. "They are still in the grip of terror when they come over the frontier to us." As the Fund workers go round the camps, almost every refugee holds out a piece of paper bearing the name of some child, or mother, or husband, who has been lost in the flight. Winter has set in abnormally early in Hungary this year and the refugees are suffering severely from lack of clothing. Most of them set out in what they were wearing at the time, with no change of garments. The Fund is supplying the children with shoes, and with warm sweaters and stockings. It is also distributing flannel which the women can make up into garments for their children now that they have reached the safety of refugee camps. All sections of the Hungarian people are showing great practical sympathy with the refugees, adds this correspondent, and the Winter Relief Fund, of which Madame Horthy, wife of the Regent, is president, has diverted a proportion of its stores, intended for the Hungarian poor, to aid the refugee children. The Save the Children Fund (20, Gordon Square, London, W.C.1) has also begun the distribution of relief to refugees who have found their way into Rumania. In Lithuania the holiday camp of the "Ose" Committee, which is working in connexion with the Fund, has opened as a home for refugee children.

Hair Dyes and Hair Dyeing

Mr. Stanley Redgrove continues to unveil to the public the secrets and mysteries of modern cosmetics. The first edition of *Hair Dyes and Hair-dyeing Chemistry and Technique* appeared in 1929 under the title of *Blonde or Brunette*. It is now revised for the second time in collaboration with an expert hairdresser, Mr. J. Bari-Woolls. It is not primarily written by any means for the medical profession but rather for practical hairdressers. Nevertheless, it is a subject that medical men, and especially dermatologists, are frequently consulted about, and if they read this volume they will at all events be better enabled to disguise their ignorance of the subject; they will find the whole question of dyes and dyeing dealt with from a strictly scientific point of view, and will be able to advise their women patients as to what processes it is wise or not for them to submit to at the hands of the hairdresser. We would particularly advise medical men to read the chapter devoted to "para," which is the trade name of paradiaminobenzine or paraphenylenediamine, which is so satisfactory as a hair dye from the cosmetic standpoint that its popularity persists notwithstanding its dangerous properties. Mr. Redgrove says that the ideal hair dye must be perfectly harmless but produce permanent colours equal to those of Nature, and must be easy to apply. It must not render the hair unresponsive to permanent waving, and it should consist of two or three solutions of such a kind that by adjusting the proportions of each any and every possible shade should be produced. We need hardly say that such a dye has not yet been discovered. The book is published by Heinemann at 10s. 6d.

The Canning of Food

A well-produced pamphlet entitled *Canned Foods* has been prepared for the use of domestic science teachers and students by the Canned Foods Advisory Bureau, 243, Regent Street, London, W.1. Members of the medical profession can obtain copies on application to that address.